MAINTENANCE OF HEALTH-PROMOTING BEHAVIOURS : THE ROLE OF SOCIAL INTERACTION, ATTITUDE, INTENTION, AND SUBJECTIVE NORM.

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Declaration

Except where otherwise indicated
this thesis is my own work.

Bruce David Millar
June 1991

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Abstract

This research investigated the relationship between social interactions and variables proposed by the Theory of Reasoned Action (Ajzen and Fishbein, 1980) as they affect both short and long term maintenance of a health-promoting behaviour. The behavioural domain employed is that of adherence to a low sodium diet either as a means of reducing a current health risk (e.g. hypertension), or to reduce the likelihood of such a health risk occurring in the future.

While social support has been well researched in its effect on psychological and physical health, there has been little interaction between this research and that addressing the relationship between attitude and behaviour. It is this interaction which is the major focus of the present research. Drawing subjects from a behaviour change clinic aimed at restriction of dietary sodium, two longitudinal studies identify the different components of social interactions, attitudes, subjective norms and behavioural intentions.

After a review of the health psychology literature and a description of the development of variables employed in this research, the results of Study One and Study Two are presented as a series of multiple regression analyses. These results enable the investigation of the adequacy of the Theory of Reasoned Action firstly within short and long term maintenance stages of the health-related behaviour, and secondly the relationship between independent variables from short term and dependent variables from long term maintenance.

In addition, a successful theoretical challenge is mounted against the claim of the Theory of Reasoned Action that all variables extraneous to the model affect intention and behaviour only indirectly, that is, through other variables within the model.

The third and major contribution of this research is the finding that social interactions, particularly those which sabotage the performance of a behaviour, affect that behaviour irrespective of psychological phenomena such as those proposed by the Theory of Reasoned Action.

Chapter 1
HEALTH PSYCHOLOGY

The collective effect of individual health-related behaviours is generally accepted as a major determinant of the overall health of the community. In terms of preventing ill health, this is a change in emphasis from environmental factors that are largely outside the control of the individual, to factors which are to a greater degree determined by his or her free choice. Reduction of environmental health risk does contain an element of individual behaviour - for example, placing household refuse in a suitable container where it is easily accessible to the collection service. However, in industrialised countries, the main areas of environmental health risk reduction - for example, water supply, sewerage, refuse collection - are under the control of local government. The obverse may also be true, that is, individual health-related behaviours may be subject to environmental (often government) control. Examples of this form of external control of health-related behaviour would be the restrictions placed on the use of certain recreational drugs, the move to ban cigarette smoking in the work place, and the enforced wearing of seat belts. This raises the problem of infringement of individual rights to the extent that the greater good of the community, as enforced through government or the legal system, could or should take precedence over these individual rights. In Australian society, there are areas where legislation aimed at enforcing change in individual health-risk behaviour would not be considered acceptable. Legal penalties for being overweight, enforced participation in exercise programs, or banning the private use of tobacco would fall into this category. It is these behaviours, where individual control or choice is the main limiting factor, which are the target of the larger part of health behaviour research in psychology.

1.0.1. Individual Behaviours and Health

As part of the 'Health For All By the Year 2000' program, the World Health Organization aims by the year 1995 to have 25% of its member states investigating the use of psychosocial and behavioural interventions in support of primary health care (Wood, 1988). There are a number of areas where the WHO has passed resolutions emphasising the importance of this type of intervention in the promotion of health. For example, there are programs aimed at the prevention of road and domestic accidents and injuries, the use of contraception, increasing breast feeding, changing attitudes and behaviour towards the elderly, the understanding and treatment of alcohol abuse, the elimination of incentives which promote and maintain the use of tobacco, research into and treatment of the mentally disabled, and developing strategies to prevent the transmission of AIDS (WHO resolutions reported in Wood, 1988). At a national level,

the Australian Government's Better Health Commission (1986) identified eight factors as the major causes of serious illness, disability and premature death. These factors are heart disease, diabetes, high blood pressure, various cancers, chronic bowel disorders, arthritis, alcohol related disease of the liver and brain, and road accidents. The commission went on to suggest that these diseases - the so-called diseases of affluence - can be largely attributed to the misuse of food, alcohol, and tobacco, with other behaviours, such as physical inactivity, also contributing. These proposed causes of disease are termed individual health risk factors (shortened to risk factors). While not considered necessary or even sufficient for the development of a disease, it is believed that the occurrence of one or more of these risk factors increases the individual's susceptibility to, or 'risk' of, contracting a specified disease. Much of the evidence in support of this association comes from demographic research, and to a smaller degree from clinical trials and laboratory experiments. Some relationships which have been established are between diet and cancer of the alimentary tract (Burkitt, 1981; McMichael, McGall, Hartshorne & Woodings, 1980), also between dietary factors, excess alcohol consumption, smoking and the increased incidence of cardiovascular disease (Dwyer & Hetzel, 1980; Hetzel, 1985; Hjermann, Vevke, Holme, & Levin 1981; Jennings, 1985; Marmot, Rose, Shipley & Thomas 1981; Maxwell & Walks, 1987; Page, 1982). Other research has identified a strong relationship between the excessive consumption of alcohol and the development of liver disease (Hetzel, 1978), and considerable evidence for a causal link between smoking and lung cancer (Doll & Peto, 1978; Peto & Doll, 1985).

1.0.2. The Role of Health Psychology in the Prevention of Disease and Premature Death

A distinction can be made between a behaviour and the outcome of a behaviour. Smoking, for example, is a health-risk behaviour which leads to the increased likelihood of cardiovascular disease. Being overweight, which may also increase the likelihood of cardiovascular disease, is not a behaviour as such, but the outcome of several different behaviours. It is not the behaviour that is the risk factor, but the change in physiology which occurs as a result of the behaviour. The primary role of the health psychologist is to determine the nature of the behaviours and antecedents of the behaviours which affect a particular risk factor. Thus, if hypertension is considered a major cardiovascular risk factor, and dietary factors have been associated with hypertension, the role of the behavioural scientist in this chain of events is to attempt to identify the psychosocial factors which contribute to diet-related behaviours. Research aimed at identifying these factors may be divided into two broad categories: descriptive research which has identified factors related to the development and maintenance of health-risk and health-promoting behaviours; and theoretical research aimed at building models of predictive power which are applicable across differing situations and behaviours.

The remainder of this first chapter reviews these two categories The first of these, descriptive research, is presented in three separate parts.

Part One reviews the application of already established psychological techniques to health-related behaviour change. This section reviews techniques drawn from the areas of behaviour therapy, cognitive behaviour therapy, and social learning theory. The application of these techniques is discussed in relation to consumption of alcohol, overeating, and groupings of behaviours found to be predictive of heart disease. Part Two describes research aimed at identifying demographic variables which have been associated with the prevalence of health-risk behaviours. Additionally, similar variables are identified as associated with change to and maintenance of health-promoting behaviours. Part Three investigates the proposed relationships between three specific personality variables and health-related behaviours.

The second category - theoretical models in health psychology - contains an evaluation of five alternative theoretical explanations of health-related behaviours - the Fear Drive Model, the Dual Process Model, Protection Motivation Theory, Self-Efficacy Theory, and the Health Belief Model. This section finishes with a justification for employing a further alternative in the present research - the Theory of Reasoned Action. This theory is fully described in Chapter Two.

1.1. Section One: Descriptive Research

Much of the research investigating interventions used in the area of health behaviour change is descriptive in nature. While these interventions may be derived from a number of theoretical view points, the research describes relationships between phenomena without attempting to place these relationships in a larger systemic or theoretical framework. The following is an example of the pragmatic rationale for this type of research (Agras 1982, p.240):

> That some of the notions upon which behaviour therapy for obesity was based may be incorrect or controversial need not concern us here, for, despite being administered in a group-didactic format more reminiscent of the outmoded conversational therapies than the performance-oriented behaviour therapies, the approach seems to work.

As this current research is intended to investigate the occurrence of general rules which may be applied across different behaviours and situations, a simple combination of factors found to be associated with a particular health-related behaviour would not be acceptable. The following review of descriptive research is undertaken to provide firstly an overview of the type of investigation generally undertaken in health psychology, and secondly as a background for the following section where several theoretical modes of behaviour change and maintenance are reviewed.

1.1.1. Part One: The Application of Already Established Techniques to Health Behaviour Change

Many behaviour change programs employ techniques which are based on existing psychological theory or clinical practice. For example, the somewhat controversial concept of controlled drinking in the area of alcohol abuse (Marlatt, 1985; McCrady, 1985; Royce, 1985; Stewart, 1985; Wallace, 1985), and a large proportion of other techniques aimed at controlling addictive behaviours are based on the principles of social learning theory, cognitive psychology, and behaviour modification (Gotestam & Melin, 1980; Marlatt & Donovan, 1981; Sobell & Sobell, 1973; Wiens & Menustik, 1983). Behavioural treatments for obesity are currently very common (Cantella, 1972; Craighead, Brownell & Horan 1981; Krantz, Grunberg & Baum, 1985; Stunkard, 1979), and treatment has typically employed operant conditioning paradigms to reinforce appropriate eating behaviour. Additionally techniques developed for the control of phobic and obsessive-compulsive disorders have also been used in weight loss programs with some success (Cairns & Altman, 1979; Mavissakalian, 1982). Modification of the coronary-prone behaviour pattern - type A behaviour - has employed behavioural and cognitive behavioural techniques. Specifically, attention has been paid to factors which maintain the behaviours even after heart attack (Powell, Friedman, Thoresen Gill & Ulmer, 1984).

Comparisons between the effectiveness of an intervention technique versus no intervention, between different intervention techniques, and between pre- and post-intervention are common in the literature. For example, comparisons have been made between operant, relaxation, cognitive, and multimodal approaches to the treatment of chronic pain (Casas, Beemsterboer & Clark 1982; Linton, 1982; Rybstein-Blinchik & Grzesiak, 1979; Tyre & Anderson, 1981; Varni, Bessman, Russo & Cardo, 1980). The effectiveness of cognitive behavioural therapy for the treatment of eating disorders has been investigated (Cordman & Kirschenbaum, 1985; Kliefield & Lindholm, 1986), as has the matching of different behaviour change techniques to the various stages of initiating and maintaining an exercise regimen (Dishman 1982; Lee & Owen 1986). This type of research has a great appeal to those involved directly in the business of effecting behaviour change. Frequently what is offered is a description of a specific technique and, adopting Agras' expression (1982), above, evidence that 'it works'.

1.1.2. Part Two: Demographic Variables and Health-related Behaviour

In addition to the research aimed at determining the effective components of *intervention* in behaviour change, there has been a considerable attempt to identify pre-intervention antecedents or correlates of health-risk behaviour, health-promoting behaviour, and the successful change from the former to the latter. With regard to health-risk behaviour the National Heart Foundation of Australia Risk Factor Prevalence Study (1983) reported relationships between the following variables - males had higher blood pressure, smoked more cigarettes, consumed more alcohol and added more salt to their food than did females. However, more females were obese, and generally had a lower level of exercise than males. An interaction between sex and age was also found for a

number of these risk factors. A similar National Heart Foundation survey in 1980 found a strong relationship between low socio-economic status and higher levels of cigarette smoking, a more sedentary lifestyle, and poor dietary practices. There was also evidence for a relationship between these behaviours and lower educational attainment. Lower scholastic achievement has also been associated with the development of smoking in young people (Bewley & Bland, 1977; Mariner & Mischler, 1967), as has the percentage of the individual's peers who smoke (Evans, 1976; Levitt & Edwards, 1970).

Similar demographic or socioeconomic variables have been described as affecting the process of *changing* health-risk behaviours and of adopting appropriate health-promoting behaviours. It is difficult to establish consistent relationships between these variables and behaviours. Positive relationships reported in the research literature include increasing age and reduction in self-initiated use of health care services (Hambur, Elliot & Parron, 1982); increasing age and the likelihood of completing treatment and gaining benefit from the treatment of alcoholism (Pattison, 1979; Schuckit, 1977); higher socio-economic status and education predicting maintenance of smoking cessation six months after myocardial infarction (Badura, 1984); lower socio-economic status with reduced likelihood of receiving health screening for cancer (pap smears) and elevated blood pressure (Cypress, 1979). There is also evidence suggesting a link between degree and type of social support and adherence to health-promoting behaviours, for example, a high level of partner support has been associated with maintenance of smoking cessation (Badura, 1984; Mermelstein, Cohen, Lichtenstein, Baer & Kamarck, 1986), and maintenance of weight loss (Brownell, Heckerman, Westlake, Hayes & Monti, 1978; Dunbar & Stunkard, 1979). Adherence to dietary regimens has been shown to be lower in those living by themselves (Archer, Rinzler & Christakis, 1967), and the percentage of other smokers in the immediate social network is related to lower maintenance of smoking cessation (Mermelstien et al, 1986; Murray, Swan, Johnson et al., 1983). The role of social interaction in determining health behaviour will be reviewed fully in Chapter Two.

There is considerable disagreement over the importance of demographic variables and social support in affecting change and adherence to health-promoting behaviours. Several reviewers (Best & Block, 1981; Dunbar & Stunkard, 1979; Stunkard, 1981) conclude that there is insufficient evidence or such ambivalent findings in this area that we are currently unable to establish any causal relationships. Stunkard (1981) suggests that this is largely due to a lack of theoretical structure with which to link the various empirical findings. The aim of the research presented in this thesis is:

(1) TO ADDRESS THIS PROBLEM THROUGH ASSESSING THE ROLE OF SOCIAL INTERACTION IN MAINTENANCE OF A HEALTH-RELATED BEHAVIOUR, AND

(2) TO PLACE THESE INTERACTIONS IN A LARGER FRAMEWORK OF A GENERALLY ACCEPTED THEORETICAL MODEL OF THE RELATIONSHIP BETWEEN ATTITUDE AND BEHAVIOUR.

1.1.3. Part Three: Personality Variables and Health-related Behaviour

There have been a number of personality variables investigated in an attempt to determine general explanations of behaviour. The variables receiving most attention in the literature are: (1) the locus of control of reinforcement; (2) health values; and, (3) attitudes towards health.

(1) Measures of locus of control identify an individual as having a belief system which views important aspects of their life, such as health, as being either largely under their own control - an internal locus of control - or under the control of powerful others or chance factors - an external locus of control. A considerable amount of work has been carried out to establish measures of general health locus of control (Wallston & Wallston, 1978; Wallston, Wallston, Kaplin & Maides, 1976). These measures have been employed in a range of health behaviour research such as maintenance of smoking cessation (Shipley, 1981), coronary prone behaviour patterns (Nowack & Sassenrath, 1980), compliance by hypertensive patients (Lewis, Morisky & Flynn, 1978), and weight loss (Chambliss & Murray, 1979). In general, the findings of this research support the view that an internal locus of control, in contrast to external, is a more powerful predictor of degree, speed of acquisition, and maintenance of health-promoting behaviours.

(2) Values, or as Rokeach (1979) describes them, the normative beliefs about desirable goals and modes of conduct, have received increasing attention over the past decade (Chaiken & Strangor, 1987). Kristiansen (1985) believes that the role individual values play in determining health-related behaviours has only recently been given serious consideration. Although there has been some research relating values directly to health behaviour (Conroy, 1979;), this construct is generally investigated in combination with other variables such as locus of control (Kaplan & Cowles, 1978).

(3) Attitude research has also experienced a marked increase over the past twenty years (Chaiken & Strangor, 1987; Cialdini, Petty & Cacioppo, 1981), and constitutes a major component of this present research into health-promoting behaviours. A review of the differing interpretations and measurement of this construct appears in Chapter Two.

1.2. Section Two: Theoretical Models in Health Psychology

As the general title of this thesis states, the overall aim of this research is to identify the relationships between the intra-individual variables of attitude and intention, and that of social interactions in determining the degree to which a health-promoting behaviour is performed, and the maintenance of this performance across time. A number of theoretical models of behaviour change may be suitable for this type of research. Several of these theories are evaluated in this section.

1.2.1. The Fear Drive Model

Fundamental to the fear drive model is the belief that the fear aroused by a persuasive message produces an unpleasant drive state which the individual is motivated to reduce. The model presents the reduction of this drive state as an essential component in producing the individual's performance of the health protective behaviour recommended in the message (Higbee, 1969; Janis, 1967). One interpretation of this model was proposed by Janis and Feshbach (1953), who suggested that the *greater* the level of fear aroused by a communication, the *lower* the effectiveness in producing the desired behaviour. Higbee (1969) in his review of fifteen years of research in fear arousal, pointed out that there is strong evidence against this concept of a negative linear relationship between fear arousal and the performance of health protective behaviours. Notwithstanding, he continued, the proposal was at that time still found in many introductory text books. Some authors have suggested a nonmonotonic relationship between the level of fear arousal and acceptance of the persuasive communication (Janis, 1967; McGuire, 1968). This corresponds to the model prescribed by the Yerkes-Dodson 'law' of arousal, the inverted 'U' hypothesis, (Yerkes & Dodson, 1908) in which both low and high levels of arousal cause poor performance with superior performance occurring at some mid range of arousal.

Research in this area has generally not supported the notion that the fear-drive model adheres to the inverted 'U' hypothesis. It is interesting to note two major streams of research, both largely rejecting the model but for apparently conflicting reasons. First, Weiner (1984) concluded from a brief review of laboratory studies of the inverted 'U' hypothesis, that increasing arousal results in either no effect, or a negative effect on performance. One possible explanation, he suggests, is that the subjects are already on the right hand side of the inverted U, that is arousal levels must be extremely low - the subject nearly asleep - to produce a detriment in performance. Hendy (1979) describes the original Yerkes-Dobson experiments as manipulating fear responses, and how 'these anxiety producing situations can have an anticipatory arousing property' (Hendy, 1979, p.12). Hence, even though not directly measuring the effect of fear arousal on action following a persuasive message, research from this area casts doubt generally on the applicability of the inverted U relationship between arousal and the performance of such actions. The second body of evidence which rejects this model comes directly from the area of fear messages and health behaviour. Higbee (1969, p.441) states:

> The widely cited conclusion that high fear arousal creates a defence-avoidance reaction which causes high threat to be less persuasive is not true in most situations. Most relevant research has indicated that high threat is superior to low threat in persuasion.

Possibly the converse of the explanation offered by Weiner (1984) may be employed to bring together these apparently contradictory findings. It may be that in this research the subjects are not sufficiently aroused (the fear not great enough) to place them on the downward, right hand side of the inverted U.

The concept of fear arousal and arousal reduction as a necessary and sufficient condition for the acceptance of a health protective message has been challenged on the following grounds. According to the model, the drive or motivation for action comes from the need to reduce the unpleasant state of arousal brought about by the fear message. This would predict that any factors which are instrumental in reducing the level of arousal, such as efficacy or specificity of the recommended action, would interact with the fear message to produce the desired change in attitude, intention or health behaviour. The majority of relevant research has not found evidence for this interaction (Beck & Frankel, 1981; Rogers, 1983). In addition, research has indicated that arousal per se, not reduction of arousal, is of primary importance in the acceptance of the persuasive communication (Giesen & Hendrick, 1974; Hendrick, Giesen & Borden, 1975). It is on this basis of lack of supportive empirical evidence that the Fear Drive model is rejected as suitable for the present research.

1.2.2. The Dual Process Model

Following from the shortcomings of the fear drive model, Leventhal and colleagues (1970; Leventhal, Safer & Penagis, 1983) have proposed and refined a dual process or parallel response model. This model states that a health protection message may simultaneously invoke an emotional (fear) and a cognitive (danger control) response. These responses are largely independent and, as such, account for the lack of interaction between variables, such as efficacy of the health-protective behaviour or specificity of the recommendations, and the level of fear arousal. Actions following on fear arousal are aimed at reducing *this* arousal and not necessarily the health threat itself. Action aimed at the reduction of health threat follow from the cognitive appraisal of the danger involved. This initial conceptualization of the Dual Process Model has been criticized by Beck and Frankel (1981) in that it does not determine the stimulus variables involved, and as a result, the model has difficulty in generating precise hypotheses regarding the two proposed processes.

In Leventhal, Meyer and Nevenz, (1980; Leventhal et al., 1983) emphasis was placed on the underlying belief structure of the recipient of the health message. This in part addressed the criticism made by Beck and Frankel (1981). However, the model generally only incorporates variables specifically related to the health consequences of the target behaviour, and may well omit consideration of non-health-related variables which nonetheless contribute significantly to the performance of the behaviour.

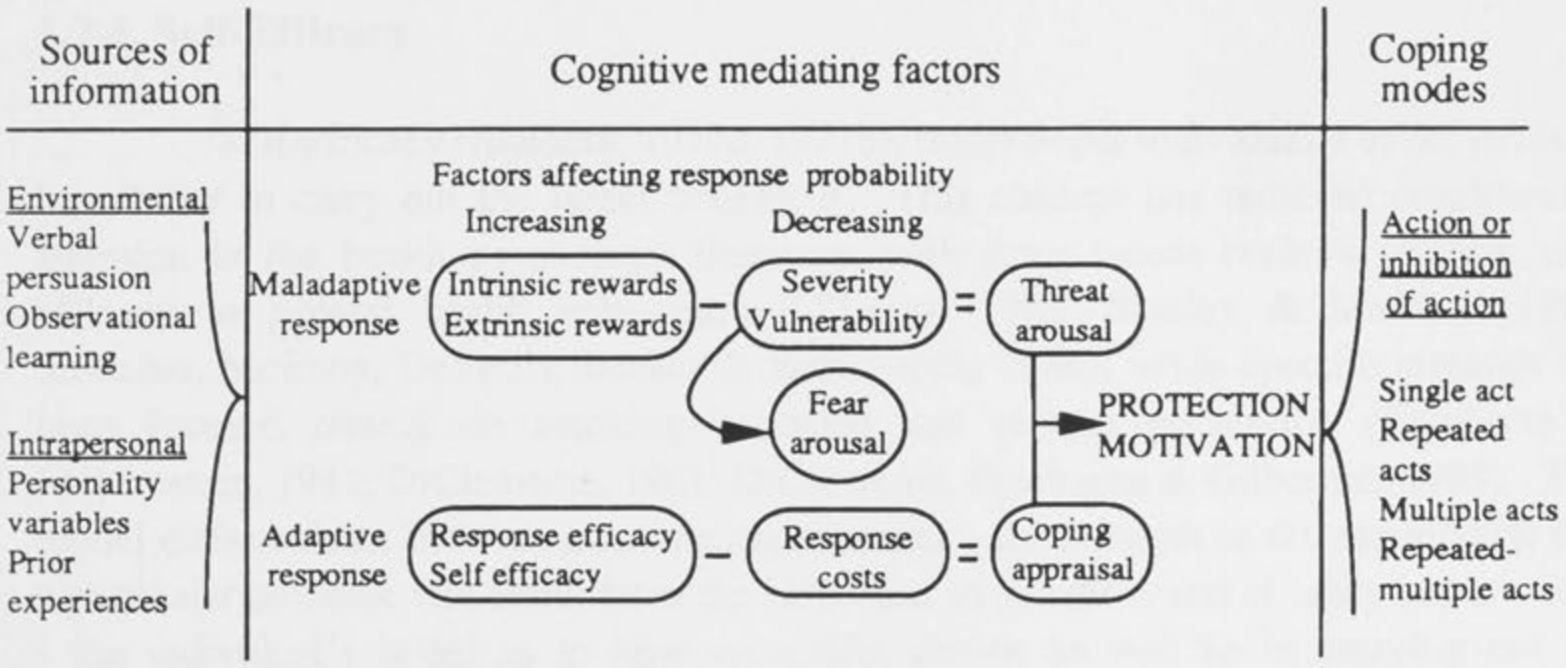
1.2.3. Protection Motivation Theory

Rogers (1975; 1983) has addressed the problem posed by Beck and Frankel (1981) and specified three components of the danger control process identified by Leventhal's (1970) Dual Process Model. Protection Motivation Theory proposes an expectancy-value model which Rogers (1983) suggests measures the three crucial variables in fear appeal. These variables are: 1. the degree of unpleasantness of the event, that is the value placed on the event; 2. the conditional probability or expectation that an event will occur if no action is taken to avert it; and 3. the effectiveness of the

action in averting the event. The cognitive mediating processes associated with these three variables of the fear message combine to form the 'protection motivation', the strength of which determines the recipient's intention to adopt the recommended protective health behaviour. The fear message variables have been operationalised in a number of investigations by presenting subjects with essays arguing for differing levels of noxiousness, response efficacy, and probability of the threat's occurrence. Rogers (1983) in a review of this research, concluded that there is evidence in support of a main effect for the first two variables, but less for the third, the probability of threat occurrence. There was little support for his original belief in the multiplicative combination of these factors.

The revised version of Protection Motivation Theory (Rogers, 1983) differs on two main points from the original formulation. Firstly, the multiplicative combination of variables is rejected in favour of an additive model. Secondly, a further component, that of self-efficacy, is introduced. The revised model, including an expanded definition of the sources of information and the coping mode, can be examined in Figure 1-1

Figure 1-1: Revised model of Protection Motivation Theory, from Rogers, 1983



The model has been successfully employed to explore factors involved in increasing breast self examination (Rippetoe, 1987) and, although unable to distinguish between subjects receiving a persuasive message and those not, Wolf, Gregory & Stephen,(1986) found support for the additive model in predicting intentions to engage in anti-nuclear war behaviour. They concluded that the model has utility not only as a means of exploring persuasive communications, but generally in predicting behavioural intentions.

Protection Motivation Theory has intrinsic appeal as a structure for guiding clinical interventions in effecting individual health behaviour change. There are, however, a number of reasons why it would not be considered appropriate for the present

research. Firstly the use of the model would be rejected simply on the grounds of parsimony. Given the number of variables included, the model may well produce significant predictions of intention or behaviour. However, the greater the number of independent variables, the larger the amount of variance accounted for in the dependent variable, irrespective of the unique contribution of each particular independent variable. Added to this, a search of the literature has produced no comparisons of the predictive power of Protection Motivation Theory to that of any other model of health behaviour change. A second major reason for not employing this model lies in the difficulty of operationalising the variables. There are a number of points to consider, one of major significance being the differentiation of proposed variables. For example, the rewards of performing a maladaptive behaviour compared to the response cost of an adaptive behaviour may, with some behaviours, be measuring the same concept. A further difficulty in operationalising lies in the combining of variables. This is largely due to problems in measurement. For example the need to determine measures of 'severity' and 'vulnerability' which when combined, produce a score which can meaningfully be subtracted from a combined measure of intrinsic and extrinsic rewards.

Although an interesting and potentially useful model, for the above reasons, Protection Motivation Theory was not chosen for the present research.

1.2.4. Self-Efficacy

Self-efficacy (Bandura, 1977a, 1977b), refers to the individual's belief in his or her ability to carry out the target behaviour. This concept has received considerable attention in the health psychology literature, with three recent reviews relating self-efficacy to general health behaviours (O'Leary, 1985; Stanley & Maddux, 1986; Stretcher, McEvoy, DeVellis, Becker & Rosenstock, 1986), while specific research has been focused mainly on smoking cessation and relapse prevention (Condiotte & Lichtenstein, 1981; DiClemente, 1981; DiClemente, Prochaska & Gilbertini, 1985). This model differentiates between outcome expectancies - the strength of the expectation that a particular outcome will result from the behaviour in question, and efficacy expectations - the individual's belief as to how successful she or he will be in carrying out the behaviour. The concept of self-efficacy is phenomenological - events external to the individual affect the strength of self-efficacy only indirectly, through the individual's perception of those events. Bandura (1977a) describes four major sources of efficacy information- performance accomplishment, vicarious experience, verbal persuasion, and emotional arousal.

Strecher et al, (1986) reviewed 21 studies which have included measures of self-efficacy as predictors of either behavioural intention or behaviour in the areas of cigarette smoking, weight control, alcohol abuse and exercise. Strecher et al. (1986, p.87) concluded that:

> For all health-related areas studied in this review, self-efficacy appears to be a consistent predictor of short and long term success

Although there has been considerable support for the prediction of behaviours by a variety of different measures of the construct of self-efficacy, several authors have criticised the validity of the construct itself. Even though generally supportive of self-efficacy theory, Strecher et al, (1986) pointed out that, when there is little variability in respondents' self-efficacy beliefs, measures of self-efficacy are less predictive of behaviour and intention. For example, where beliefs in self-efficacy are all uniformally high because of the ease of carrying out the behaviour, the most important determinant is not self-efficacy but the outcome expectancy held by the individual. Kirsch (1982, 1986) argued that, what is measured is not the individual's belief that he or she can carry out the behaviour, but rather his or her *willingness* to do so. Kirsch (1982) pointed out that the individual is more likely to be evaluating her or his ability to cope with the consequences of their actions than the performance of the action itself. He suggested that it is not that people are physically unable to approach a phobic object, but that they are unwilling to tolerate the unpleasant emotional state resulting from this behaviour. Where there are no physical, intellectual or environmental restrictions on carrying out the behaviour, measures of self-efficacy can be seen as identifying expectations regarding the immediate consequences of an action. This view of self-efficacy sees it as undifferentiated from outcome expectations, simply shifting the temporal location of the outcome from long term to immediate. Eastman and Marzillier (1984, p. 225) in their critique of self-efficacy theory, suggested that it is

> ..... impossible to exclude outcome considerations from efficacy expectations. People are concerned about the outcome of their behaviour as well as their competency to perform a task.

While not constituting empirical evidence, an example illustrates this criticism of the construct of self-efficacy. Smoking has recently been banned in all Australian Commonwealth buildings. This restriction will be likely to effect a change in the judgement of self-efficacy reported by chain-smoking public servants, in relation to their ability to sit at a desk for one hour without smoking a cigarette. Neither the ability to carry out or abstain from the behaviour (smoking) nor the long term consequences have changed. What has changed is the expectation of the immediate consequences of the behaviour, not their belief in their ability to carry out the behaviour per se. The effects of these consequences on the performance of the behaviour would vary depending on the value the individual placed on them.

Most health-protective behaviours are within the physical capabilities of most of the target population employed in health-behaviour research. Given that, there would appear to be little value in employing a measure of 'self-efficacy' over an adequate expectancy/value measure of the short term consequences of carrying out a particular behaviour.

1.2.5. The Health Belief Model

The Health Belief Model describes an individual's health-related behaviour as determined by a combination of expectations and values regarding the outcome of that behaviour (Becker & Miaman, 1975; Janz & Becker, 1984). The relevant expectations are seen as 'the individual's estimate of the threat of illness, and the likelihood of being able, through personal action, to reduce that threat', whereas the value component is seen as 'the desire to avoid illness (or if ill to get well)' (Janz & Becker, 1984, p.2)

The Health Belief Model consists of four main components (Becker, Kalack & Rosenstock, 1974; Becker & Miaman, 1975; Rosenstock, 1974).

1. The perceived susceptibility - the individual's belief regarding her or his likelihood of contracting a particular condition;

2. The perceived seriousness of the disease - this incorporates both fear arousal and the representation of the danger;

3. The perceived benefits of taking action - given that someone believes him or herself susceptible to a disease, and considers that disease serious, this person would probably choose the course of action most likely to reduce the health risk;

4.The barriers to taking action - any negative consequences of carrying out the behaviour identified as beneficial, or any factor which increases the difficulty of carrying out the behaviour.

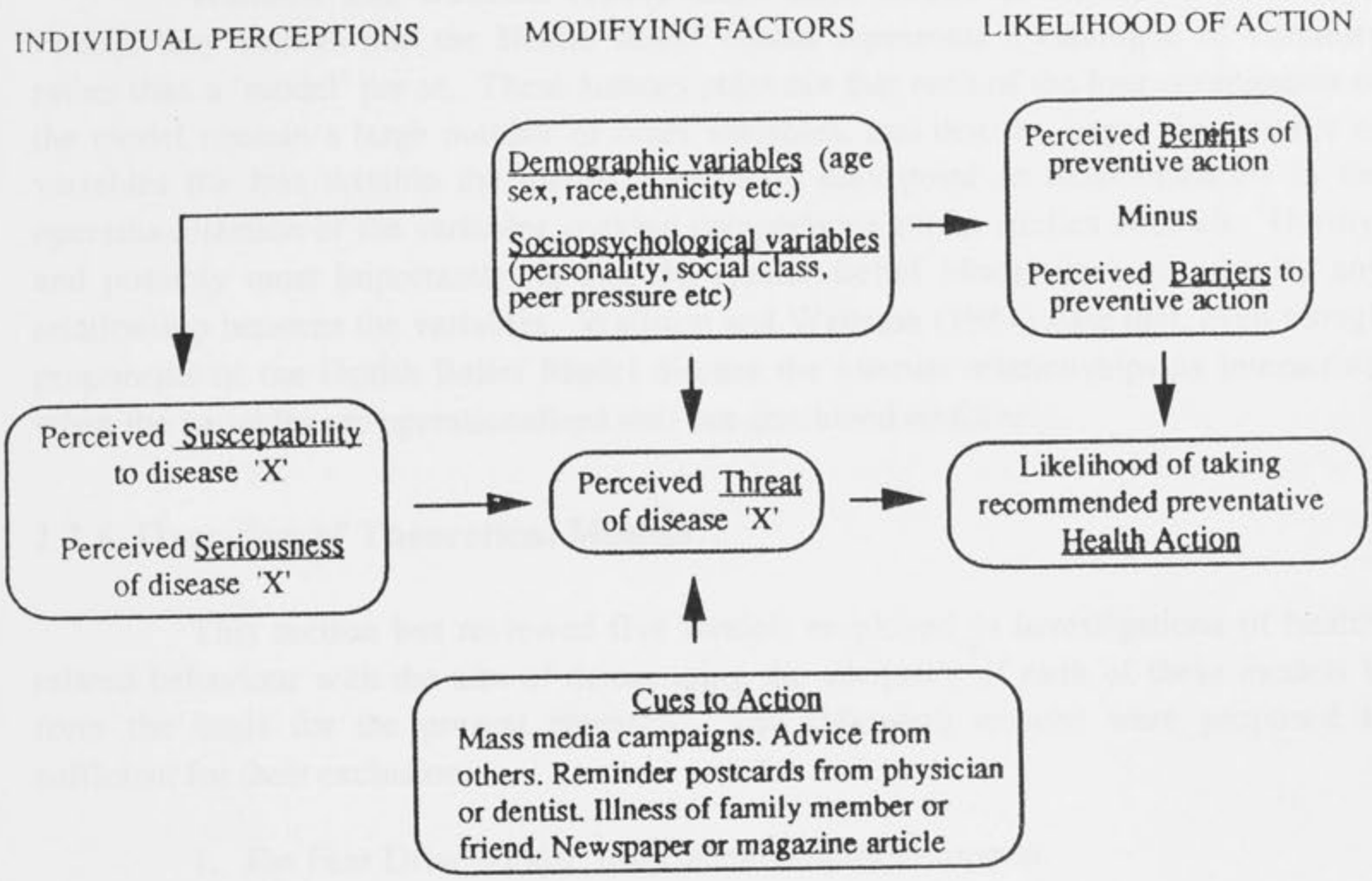
The original form of the Health Belief Model as described by Becker et al, (1974) appears in Figure 1-2.

In addition to the four components outlined above, the model described in Figure 1-2 contains a further component, the 'modifying factors'. This addition includes the internal (physical symptoms) and external (information from others) cues to initiate the preventive health behaviour. Further to that, demographic, sociopsychological and structural variables are considered important insofar as they affect the perception of health threat (Janz & Becker, 1984).

There have been a number of studies which employ the Health Belief Model to investigate preventive health behaviour. These have included the use of diet and exercise in reducing obesity (Becker et al, 1974; O'Connel, 1985); participation in 'flu innoculation (Aho, 1979); participation in a genetic screening program (Becker et al, 1975); compliance to antihypertensive medical regimens (Kirscht & Rosenstock, 1977); compliance with regimens for the control of diabetes (Cherkony & Hart, 1980); and utilization of health care services (Leavitt, 1979).

There are some apparent inconsistencies between the model as proposed above, the way the components have been operationalised, and the empirical results. The model consists of expectations and values regarding the outcome of particular behaviours. However, the relationship between these concepts is not made clear. The

Figure 1-2: The Health Belief Model from Janz and Becker, 1984



value component, when actually measured, consists of evaluations of an individual's desire to be healthy or to reduce ill health. As Janz and Becker (1984, p.44) have stated

> .... the model is predicated on the premise that 'health' is a highly valued concern or goal for most individuals .... where these conditions are not satisfied, the model is not likely to be useful in, or relevant to, explaining behaviour.

These authors reviewed 29 investigations and found that the four components of the model occur in the following descending order of importance in predicting actual behaviour - barriers, benefits, susceptibility and severity. Becker, Miaman, Kirscht, Heafner & Drachman, (1977), in attempting to predict mothers' adherence to a weight loss diet for their obese children, give examples of the barriers to action component as: 'ease of diet compared to others' and 'easy/difficult to get through the day' (Becker et al, 1977, p. 357). These then are examples of the construct identified by Janz and Becker (1984) as the most powerful predictor of behaviour. In the proposed expectancy value model, these outcome expectancy items, which are 'estimates of physical, psychological, financial, or other costs involved in the proposed action' (Becker et al, 1977, p.353) are seen as important only insofar as they combine, in some undefined way, with a general health value. More specifically they are seen as predictive of behaviour only if 'health is a highly valued concern or goal' (Janz & Becker, 1984, p.44). This would seem a weakness in the Health Belief Model as the predictive usefulness of short term outcomes or costs of the behaviour, would be determined by evaluations of these short term

outcomes, rather than some long term health benefit. The value placed on short term outcomes is not incorporated into the Health Belief Model.

Wallston and Wallston (1984) make three further criticisms of the model. Firstly, they believe that the Health Belief Model represents a catalogue of variables rather than a 'model' per se. These authors point out that each of the four components of the model contain a large number of other variables, and that the larger the number of variables the less testable the theory. Secondly they point to inconsistencies in the operationalization of the variables, making comparisons across studies difficult. Thirdly, and possibly most importantly, is that the Health Belief Model does not specify any relationship between the variables. Wallston and Wallston (1984) state that, even though proponents of the Health Belief Model discuss the internal relationships as interactive, when the variables are operationalised they are combined additively.

1.2.6. Overview of Theoretical Models

This section has reviewed five models employed in investigations of health-related behaviour with the aim of determining the adequacy of each of these models to form the basis for the present research. The following reasons were proposed as sufficient for their exclusion.

1. The Fear Drive Model: insufficient empirical support.

2. The Dual Process Model: difficulty in deriving testable hypotheses, and no consideration of non-health-related consequences of the behaviour.

3. Protection Motivation Theory: overinclusive and therefore likely to reduce applicability in differing situations, also a number of problems in operationalising the variables.

4. Self-Efficacy: in terms of health-related behaviour, difficulty in differentiating this concept from the more commonly employed outcome/expectation.

5. The Health Belief Model: excluded on the grounds of parsimony, also due to lack of congruence between measures of the outcome of a *specific* behaviour, and the measure of *general* value placed on health. A further criticism is the lack of adequately defined methodology for the combination of other variables within the model.

Although each of these models has, to varying degrees, been successfully employed in health -behaviour research none was chosen for the present investigation due to the limitations outlined above. What was required was a relatively unambiguous model which would allow for the inclusion of other variables of interest - in the present instance, for a measure of social interactions.

It is proposed that the model derived from the Theory of Reasoned Action (Fishbein & Ajzen, 1975) is suitable for exploring the relationship between attitudes, intentions, and social interactions as determinants of health-related behaviours. The theoretical base and the research applications of this theory are reviewed fully in the following Chapter.

Chapter 2

THE FISHBEIN/AJZEN MODEL AND SOCIAL INTERACTION

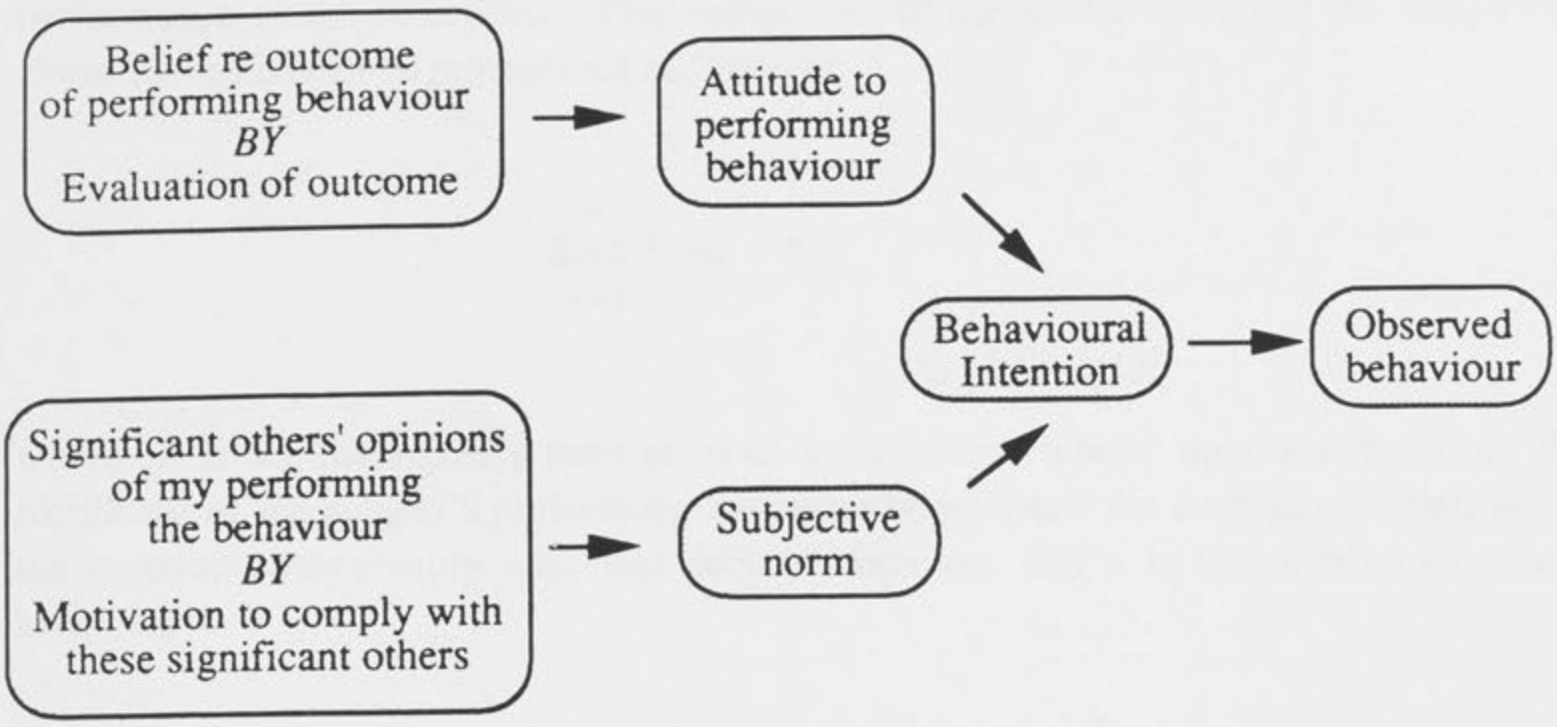
Fishbein and Ajzen's Theory of Reasoned Action (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980) has been widely used in the prediction of health-related behaviours. This Chapter reviews the use of this model in its original form, and with proposed additions and alternative interpretations of the variables. Research investigating the importance of social interactions for the acquisition and maintenance of health-promoting behaviour is also reviewed. It is proposed that the relationship of social interactions to the performance of such behaviours is better understood when placed within the larger theoretical framework of the Theory of Reasoned Action.

2.1. The Theory of Reasoned Action

Of the numerous models describing the antecedents of health behaviours reviewed in Chapter One, few consider individual attitudes towards the behaviour or object of the behaviour, relying rather on more global measures, such as environmental factors. The Theory of Reasoned Action (Fishbein, 1967; Fishbein & Ajzen, 1975, Ajzen & Fishbein, 1980) proposes the individual's attitude towards an action as a major determinant of the performance of that action. This theory, represented schematically in the Figure 2-1 describes an unambiguous relationship between variables proposed as the psychological antecedents of behaviour. In addition, a well established methodology for operationalising the variables is defined by Ajzen and Fishbein (1980). As such the Theory of Reasoned Action overcomes many of the problems identified in the models described previously, and on that basis was chosen for the present investigation of the relationships between attitude, intention, and social interaction, as predictors of health-related behaviours.

The Theory of Reasoned Action conceptualises an overall attitude towards performing a behaviour as consisting of three components - cognition, affect, and conation. The first of these, cognition, consists of the beliefs which the individual has regarding the outcome of performing the behaviour. These outcome beliefs determine the affective response towards performing the behaviour - how positively or negatively the individual rates this behaviour. This affective response is proposed by the theory as a major determinant of the intention to actually carry out the behaviour - the conative component. While many attitude theorists have viewed attitude as incorporating all three of these components, actual measures of attitude have almost without exception concentrated on the affective component (Fishbein, 1967; Mueller, 1986). The Theory of

Figure 2-1: The Theory of Reasoned Action



Reasoned Action employs the term 'attitude' only in relation to the affective response held by the individual regarding their actual performance of the behaviour. The remainder of this section describes these three components of the theory in detail as well as a further social determinant of intention, the subjective norm.

2.1.1. The Rational Basis of Attitude

The Theory of Reasoned Action proposes that where an action is under volitional control, the individual chooses his or her behaviour through a process of more or less rational appraisal of the available data. This appraisal involves establishing the subjective likelihood of a number of possible outcomes of the behaviour, and weighting these outcomes as a function of the individual's evaluation of them. This interaction between likelihood and evaluation comprises the cognitive component of the model, which is proposed as the basis for the individual's attitude (affect) towards performing the behaviour. The relationship between the cognitive and affective components of the model is represented by the following equation

$$\sum_{i=1}^{n} b \times e = Aact$$

where b is the individual's belief that performing a specific behaviour will result in some outcome, e is the evaluation of that outcome, n is the number of salient beliefs the individual holds regarding performing the behaviour,and Aact is the attitude (or affective response) towards carrying out the behaviour.

2.1.2. Subjective Norm: the Effect of Others' Opinions

A second major determinant of action proposed by this model is the importance to the individual of significant others' opinions regarding her or his performance of the behaviour. This component of the model is termed the Subjective Norm (SN), and can be represented as follows:

$$\sum_{i=1}^{n} nb \times mc = SN$$

where nb is the individual's perception of a significant others' opinions regarding the likelihood of the subject's performing the target behaviour - the normative belief, mc is the motivation to comply with that person's opinion, and n is the number of others involved.

2.1.3. Attitude and Subjective Norm as Antecedents of Behavioural Intention

Both the attitude towards the act and the subjective norm are employed by the individual in forming his or her intention to carry out the target behaviour (the connative component). This behavioural intention (BI) is proposed as the immediate antecedent of the target behaviour (B) and, as such, provides the best predictor of that behaviour. The overall model can be expressed by the following equation:

$$(Aact)w_1 + (SN)w_2 = BI \text{ -- } B$$

where w_1 and w_2 are empirical weights determined by multiple regression analysis. These weights represent the relative importance of attitude and subjective norm in producing the intention. The contribution of each of these two variables will vary depending on the individual, the situation, and the behaviour.

An important aspect of this theory is the need to ensure a high degree of correspondence between measures of the components. Lack of correspondence is considered by the authors of this theory as a factor which will reduce the accuracy of prediction at all levels. The four elements which affect the level of correspondence are the *action* in question, the *target* of that action, the *context* and the *time* frame in which the action is carried out. The degree to which the measurement of components of the theory vary with regard to these elements (in particular action and target) will determine the accuracy of prediction between variables.

Having defined the variables and relationships between variables proposed by the Theory of Reasoned Action, the following section deals firstly with the application of the theory generally, and then specifically to the prediction of whether a person will engage in health-related behaviours.

2.1.4. Applications of the Theory of Reasoned Action

Several reviews of research into attitude and attitude measurement have identified the Theory of Reasoned Action as the most influential model of the past decade (Chaiken & Strangor, 1987; Cialdini, Petty & Cacioppo, 1981). The model has been widely and successfully applied in a number of areas outside that of predicting health-related behaviour, for example, to determine the factors which influence young women's intentions to either become a homemaker or take a career (Sperber, Fishbein & Ajzen, 1980). It has also been used in the field of market research, in relation to intentions to purchase differing brands of beer, toothpaste and automobiles (Fishbein & Ajzen, 1980), factors determining intentions to vote for a particular candidate in the United States presidential election have also been investigated (Fishbein, Ajzen & Hinkle 1980). Further studies include intention to re-enlist in the United States National Guard (Hom, Katerberg & Hulin, 1979), and public reaction to the use of nuclear power plants as a source of electrical energy (Bowman & Fishbein, 1978).

The Theory of Reasoned Action has also been successfully employed in investigating a number of health-related behaviours such as predicting the intention to carry out an exercise program and to adhere to a weight loss diet, as well as actual weight loss (Sejwacz, Ajzen & Fishbein, 1980). The intention to have another child within the next two years (Davidson & Jaccard, 1979), has also been studied. The theory has been employed in the investigation of blood donating behaviour (Bagozzi, 1981), and to test changes in intention to use different forms of contraception as a result of changing either the attitudinal or normative components of the model (McCarty, 1981). Other applications of the theory to health-related behaviour include the amount of alcohol consumed in an adolescent group (Schlegal, Crawford & Sanborn, 1977), and the identification of psychosocial variables associated with the use of smokeless tobacco amongst 10 to 14 year old male students (Brubaker & Loftin, 1987).

Fishbein and Ajzen (1975) reviewed thirteen tests of the Theory of Reasoned Action with twenty-one different populations involving intentions as varied as cheating in college, game playing, taking birth control pills, and signing up for treatment of alcoholism. Within the papers reviewed, the multiple correlations between the two predictors of intention, attitude and subjective norm, and the intention to carry out the various behaviours ranged from .57 to .87 with a median correlation of .75. These results and the studies mentioned above indicate the considerable contribution that the Theory of Reasoned Action has made to the prediction and understanding of behaviour generally, and in particular, health-related behaviour.

While the preceding review indicated the considerable predictive and explanatory power of the Theory of Reasoned Action, it may be that its utility would be enhanced by conceptualizing the relationship between variables differently, or by the addition of other variables. The following section addresses this possibility through a review of proposed alternatives to the original formulation of the theory.

2.2. Challenges and Additions to the Theory of Reasoned Action

There have been a number of papers suggesting that additional variables should be incorporated into the existing theory. The main challenges to the model can be grouped under three headings.

1. The first major challenge is directed at the model's definition of 'attitude', and whether or not a multidimensional measure will better predict behaviour than a unidimensional (affect only) measure.

2. Secondly, factors other than attitude and subjective norm have been proposed as directly affecting behavioural intention. This is contrary to the Theory of Reasoned Action which proposes that these two variables are the only ones which have direct effects on intention. Other variables are seen as affecting behavioural intention (and, hence, behaviour) only by their contribution to the content and the relative weights of attitude and subjective norm.

3. Thirdly, other factors have been proposed as intervening between the behavioural intention and the behaviour. This is also contrary to the Theory of Reasoned Action which claims that all variables affect behaviour *only* through changing the behavioural intention.

The following three sections evaluate these challenges, that is: (1) the suitability of a unidimensional attitude measure, (2) the proposed addition of other variables directly affecting behavioural intention, and (3) the proposed addition of other variables between behavioural intention and behaviour.

2.2.1. The Suitability of a Unidimensional Attitude Measure

The Theory of Reasoned Action proposes cognition, affect, and connation as three related but separate antecedents of behaviour. It is also clearly stated by Ajzen and Fishbein (1980) that their model is sequential - behavioural beliefs lead to an affect or attitude to performing a behaviour, which in turn determines the intention to perform the behaviour. Thus, the Theory of Reasoned Action proposes that attitude is represented best by a measure of affective state. There has recently been a challenge to this unidimensional interpretation of attitude. Reanalysing data from Fishbein and Ajzen (1974), which the original authors claim support the unidimensional approach, Bagozzi and Burnkrant (1979) suggest that the affective and cognitive variables combine to form a better predictor of behaviour than either variable considered separately. Using the same data, but with an updated version of the LISREL analysis (LISREL IV, Joreskog & Sorbom, 1978), Dillon and Kumar (1985) reported results again in favour of the usefulness of measuring attitude as a unidimensional construct. Still with the same data and using a more recent edition of LISREL (LISREL VI, Joreskog & Sorbom, 1984), Bagozzi and Burnkrant (1985) interpreted the results as indicating a two dimensional construct of attitude. Chaiken and Stangor (1987) in their review of this research conclude that it is difficult to determine, from the evidence to hand, which view of attitude has the most support, given that the differing results seem determined by the type of LISREL program employed and the model building ability of the researcher.

A less obvious challenge occurs through the considerable variation between studies employing the Theory of Reasoned Action in the choice of attitude measures - cognitive or affective. There is also variation in the methods employed to operationalize the subjective norm. For example, Seibold and Roper (1979) employed a cognitive attitude measure which consisted of fifteen expectancy by evaluation items. These authors also employed a measure of subjective norm which consisted of a simple summation of twelve normative beliefs, that is with no consideration of the individual's motivation to comply with these significant others.

Ajzen and Madden (1986) analysed models employing cognitive *and* affective attitude measures as well as *two* subjective norm measures. These latter measures consisted of firstly, the summed scores of a number of significant others' opinions by motivation to comply, and secondly, a general measure of 'most people who are important to me' by motivation to comply. Their final analysis employed the semantic differential and general subjective norm measures as the components of the model against which to test the addition of their measures of perceived control in a multiple regression onto behavioural intention. However, they reported that the results with the other two measures, the belief based measures, were virtually identical. This reporting of the comparison of these measures suggests that even one of the primary authors of the Theory of Reasoned Action (Ajzen) considers it acceptable, or even necessary, to establish the situationally determined weighting of the different methods operationalising 'attitude' and 'subjective norm', before testing the significance of any variable extraneous to the model.

In discussing the results of his research, Brinberg (1979, p.574) summarises

> These data suggest that Σbiei [i.e. cognitive attitude] is a more effective prediction of intention than the attitude measure [ie affective attitude] ..... In most studies the attitude measure is likely to be a more accurate indicant of the underlying evaluative dimension. However the attitude measure is nothing more than a different set of beliefs. Therefore, it is possible that there will be cases when Σbiei is a better indicant of this underlying evaluative dimension.

In summary, the research reviewed in this section has employed different measures to arrive at the attitude and subjective norm measures of the Theory of Reasoned Action. Several recognised authorities in this area have indicated the need to determine which measures contribute the most in a regression analysis prior to testing the significance of any extraneous variables. There is also some disagreement over the nature of the concept of attitude - whether it is best described as unidimensional or multidimensional.

Even though the Theory of Reasoned Action suggests that the direct antecedents of intention are the *affective* attitude and *general* subjective norm, tests of this theory have often not employed these measures and have on occasion represented the different measures as contributing *independent* amounts to the variance in intention. Therefore, this current research will first determine which of the Theory of Reasoned Action variables are significant predictors of the dependent variables (either intention or behaviour) by entering all available Theory of Reasoned Action variables into a multiple regression analysis.

Following this, the significance of the additional variable of social interaction will be determined. Apart from the justification for the approach provided by the literature reviewed above, this research required knowledge of as many intra-psychic determinants of behaviour as were available. This breadth of information decreases the likelihood of falsely finding an independent effect external to the respondent - i.e. that of social interaction.

The following two sections review investigation into the addition to the Theory of Reasoned Action of variables other than social interaction. Section 2.3 describes research determining the relationship between social interaction and health. The Chapter finishes with an explanation of the methods employed to test the effect of social interactions on health-related behaviour when placed within the context of the Theory of Reasoned Action. In particular the sequential nature of the variables proposed by the Theory of Reasoned Action is challenged through the addition of a measure of social interactions within a longitudinal study.

2.2.2. The Addition of Other Variables Directly Affecting Behavioural Intention

According to the Theory of Reasoned Action, the mechanism through which any variable extraneous to the model changes intention is via its effect on either the attitude towards the act and/or the subjective norm. Changes in attitude are produced by changing the beliefs regarding the various outcomes of performing the behaviour, or by changing the evaluation of these outcomes. Similarly, changes in subjective norm follow from changes in the individual's perception of, or the actual opinions of significant others regarding the individual's carrying out the behaviour. Changes in the subjective norm could also be achieved by changing the motivation to comply with the significant others. Variables extraneous to the model may influence the relative weights of the attitude and subjective norm in determining behavioural intention, but do not have direct effects on intention.

This section reviews a number of variables which have been proposed as influencing behavioural intention independently of their effect on attitude or subjective norm. Firstly, the predictors of intention proposed by Triandis (1977, 1980) are considered. This is followed by brief reviews of the importance of locus of control of reinforcement in determining intention. The addition of measures of distal variables to the Theory of Reasoned Action is discussed, and finally the value of employing measures of prior occurrences of the behaviour is considered.

2.2.2.1. The Triandis model and prediction of intention

Triandis (1977) proposed three factors which contribute to the intention component of his model. The first of these is a social factor which consists of norms, roles, self concept, moral norms, ideals and contractual agreement. The second is the affect towards performing the behaviour, and the third is an expectancy-value measure of attitude. While superficially similar, there are two important differences between the determinants of intention proposed by the Triandis model and the Theory of Reasoned

Action. First, a major difference occurs in the role of the expectancy-value component. Triandis conceptualises this as directly affecting intention, while in the Theory of Reasoned Action it is restricted in its contribution to the formation of the affective response to performing the behaviour. The second difference occurs in the consideration of social factors where the Triandis model measures a much broader range of constructs than the subjective norm of the Theory of Reasoned Action.

Several studies have directly compared the predictive power of these two models. For example Seibold and Roper (1979) investigated three intentions related to cervical cancer detection in four different samples of women. They reported overall higher multiple correlations for the Triandis model than the Theory of Reasoned Action in the prediction of intention. However, this apparent superiority of the Triandis model may be a result of the fact that Seibold and Roper did not operationalize the Theory of Reasoned Action in the method prescribed by the theory's authors. An affective measure of attitude was not employed in the measurement of the latter theory, and it is this measure, incorporated in the Triandis model, which produced the difference between the size of the multiple regression coefficient in the two models. A more exact measurement of the Theory of Reasoned Action variables may well reverse the findings or conclude that there is little difference between the two theories.

Evidence suggesting a poorer prediction of intention by the Triandis model than that obtained by the Theory of Reasoned Action was reported by Jaccard and Davidson (1975). Contrary findings were obtained by Brinberg (1979), who suggested that the Triandis model may be superior where there are moral implications to the performance of the behaviour. The addition of a measure of moral obligation was found by Davidson and Jaccard (1979) significantly to increase the prediction of intention over and above the two components of the Theory of Reasoned Action. However, this occurred only in 'moral', but not in 'non-moral' situations. While the performance of a particular health-promoting behaviour may have moral overtones in specific situations - for example reducing alcohol consumption - it is unlikely that most would be seen by the general population as constituting a moral situation.

The empirical results have not adequately supported the claim that the Triandis model is superior in the prediction of behavioural intention over the prediction obtained by the Theory of Reasoned Action when the latter model is operationalised according to directions given by its authors.

2.2.2.2. Locus of Control

Locus of control of reinforcement has also been considered as a potential independent predictor of behavioural intention. Kirstiansen and Eisser (1986) employed an interaction of behavioural expectations, with a measure of multiple health locus of control, and found this added a small, but significant amount to the prediction of intention over attitude and subjective norm alone. Saltzer (1978) found that with subjects reporting an 'internal' weight locus of control, attitude was the best predictor of intention to lose weight. With subjects reporting an 'external' weight locus of control the subjective norm was the best predictor of the dependent variable. Saltzer (1981) has,

however, been unable to replicate his original results. The findings reported by Kirstiansen and Eisser (1986) and Saltzer (1978), suggest that locus of control may have an effect on the relative weightings of the attitude and subjective norm components of the Theory of Reasoned Action. This is quite consistent with the role of all external variables proposed by the theory.

2.2.2.3. Distal Variables

It may be that variables not obviously connected with a particular behaviour could have an effect on intention. For example, an overall political stance may strongly influence the intention to attend a government funded health screening. Chassin, Corty, Presson et al., (1981) point out that the Theory of Reasoned Action only takes into account variables which are *proximally* related to the intention to perform a behaviour, that is, the attitude and subjective norm regarding a specific behaviour. Variables which have only a non-obvious relationship with intention are termed distal variables. Chassin et al. (1981) propose that an adequate explanation and prediction of any behaviour requires the addition of such distal variables to the Theory of Reasoned Action. These authors chose seventeen distal variables from Jessor and Jessor's (1977) personality and perceived environment system. These variables ranged from the value placed on academic success and independence to the degree of agreement exhibited between the individual's parents' opinion regarding his or her overall behaviour. In the prediction of a number of behavioural intentions regarding smoking, these distal variables added significantly to that obtained by the proximal variables of attitude and subjective norm derived from the Theory of Reasoned Action. In predicting non-smokers' intention to start smoking, the distal variables accounted for between 2 - 4% of the variance. This figure rose to 15% for regular smokers. The difference in the amount of additional variance explained was a result of a reduction in the correlation between the the Theory of Reasoned Action variables and intention, rather than by any increase in the correlation of the distal variables with intention. One possible explanation for the pattern of results is that there are variations within the salient components of attitude and subjective norm for different subgroups, or perhaps that starting smoking is a different behaviour to continuing to smoke and, as such, would require different measures of attitude and subjective norm. A direct match of attitude with behaviour was not achieved by Chassin et al. (1981), as the same measures were employed for the behaviours of starting to smoke for non-smokers, and continuing to smoke for current smokers. This, therefore, cannot be regarded as an adequate test of the Theory of Reasoned Action.

2.2.2.4. Past Behaviour

A further proposed predictor of behavioural intention is the frequency of the occurrence of the behaviour prior to the measure of intention. A number of studies have found that this variable adds significantly to the prediction of behavioural intention and of actual behaviour. These studies are reviewed in the following section. An important point to note here is that the Theory of Reasoned Action is proposed as a model which has not only considerable predictive power, but also explanatory power. Knowledge of the frequency of the occurrence of a behaviour adds little to the *explanation* of the intention to carry out the behaviour in the future. An explanation of behavioural

intention in terms of attitude and subjective norm provide a causal model which enables the positing of specific reasons why a particular intention arises. Measures of prior behaviour offer no such opportunity, leading rather to a somewhat circular need then to explain the cause of this prior behaviour. As such, the inclusion of a measure of prior behaviour in the Theory of Reasoned Action is of limited value in determining the significant factors leading to the intention to carry out a health-related behaviour.

2.2.3. The Addition of Other Variables Between Behavioural Intention and Behaviour

A number of studies have produced results which support the claim that there may be variables which have an effect on behaviour independent of their effect on intention. Triandis (1977, 1980) proposed that the 'habit strength' is such a variable. This author agrees with the Theory of Reasoned Action in suggesting that behavioural intention as the best predictor of behaviour. However, Triandis proposes that this is only true if the behaviour has never occurred in the individual's history; as the behaviour repeatedly occurs, the importance of past behaviour - the habit strength - increases, while that of the behavioural intention decreases. So, for a well established, overlearned behaviour, habit strength is proposed by Triandis as the best predictor of behaviour. A further component of Triandis' model concerns external factors, such as level of financial income or race, which are considered by Triandis to influence the performance of the behaviour. Empirical tests of this theory have produced conflicting results ranging from habit strength as the only predictor of behaviour - that is excluding intention (Landis, Triandis & Adampoulis, 1978), through to intention as the only predictor of behaviour - excluding habit strength (Adampoulis & Brinberg, 1975).

While not employing the term habit strength, a number of other studies have investigated past behaviour as a predictor of future behaviour. Fredricks and Dossett (1983) found not only that a measure of past behaviour predicted intention and future behaviour, but that by including this measure, the path coefficient of intention became non-significant. In addition, Bentler and Speckart (1979) found a measure of intention provided the best predictor of drug and alcohol taking but that the addition of a measure of past behaviour added to the explanation of their data, while Manstead, Proffitt and Smart (1983) found that past behaviour added to the prediction of the choice of infant feeding practice over that of intention alone. In addition to the direct effect of past behaviour on future behaviour, Bentler and Speckart (1979) and Manstead et al.(1983) also found evidence to indicate a similar direct effect of attitude on behaviour. Fredricks and Dossett (1983) pointed out that the measures employed by Bentler and Speckart (1979) did not correspond directly to those specified by Fishbein and Ajzen (1975), which may account for the discrepant findings. In a direct comparison of the Theory of Reasoned Action and the revision of the model proposed by Bentler and Speckart (1979) Fredricks and Dossett (1983) found not only that a measure of past behaviour predicted future behaviour, but that by including this measure, the effects of intention became non-significant. There appears to be a quite strong case for accepting past behaviour as a significant predictor of future behaviour, over and above the other components of the Theory of Reasoned Action. However, as mentioned above, simply adding variables

which increase the amount of variance accounted for in the dependent variable, does not necessarily increase the explanatory power of a model. Stated in terms of the area of interest for this research, a particular-health promoting behaviour may well best be *predicted* by including a measure of the frequency of occurrence of that behaviour in the individual's past. It is of little value, however, to attempt to investigate the psychosocial factors leading to the performance of a behaviour by stating that the behaviour had previously occurred. In this research, a measure of the current performance of the target health-related behaviour is not considered a *determinant* of future behaviour and is, therefore, excluded as an independent variable in the analysis of behaviour maintenance.

In response to the finding discussed in the preceding paragraph, Ajzen (1985; Ajzen, 1988; Ajzen & Madden, 1986; Schifter & Ajzen, 1985) has proposed adding a further component of 'perceived behavioural control' to the Theory of Reasoned Action. He acknowledged the importance of past behaviour in the development of the perception of control, but suggested that vicarious experience with the behaviour and other factors facilitating or hindering the performance of the behaviour are also significant. Ajzen and Madden (1986) propose the following factors as possibly affecting control over intended action: 1. factors internal to the individual, being skills, abilities and knowledge; 2. external factors of time, opportunity; and 3. the dependence of the behaviour on the cooperation of other people. The significance, for the present research, of these three components of perceived behavioural control is explored further in Chapter Three. It will be argued that a priori, there is no reason to consider that the first two components described here will produce individual variations in the target behaviour studied.

The importance of perceived behavioural control as an antecedent of behaviour is considered by Ajzen (1988; Ajzen and Madden, 1986) to be directly related to the extent to which the behaviour is under volitional control, so that when the behaviour *is* under volitional control, perceived behavioural control becomes largely irrelevant for predicting behaviour and the original formulation of the Theory of Reasoned Action stands. Ajzen (1985) clearly distinguished between behaviour which he described as under volitional control and that which is not. In his description of the Theory of Reasoned Action the example employed was that of adopting a low sodium diet. It would seem from this that Ajzen would describe this particular behaviour as under volitional control, and, therefore, not likely to be affected by any perception of behavioural control. This present research uses adherence to a low sodium diet in determining the role of social interactions in a behaviour viewed as under volitional control, and therefore best explained by the original formulation of the Theory of Reasoned Action

Ajzen and Madden (1986) proposed that the interaction between perceived behavioural control and attitude, and the interaction between perceived behavioural control and subjective norm, would increase the prediction of intention over that obtained from attitude and subjective norm alone. This proposal was unsupported by their research findings. They did, however, find that perceived behavioural control by itself added significantly to the prediction of intention over the other two variables. A similar relationship was found by Schifter and Ajzen (1985), although the regression coefficient of intention as a predictor of behaviour was not significant.

There have been a number of strong challenges to the contention of the Theory of Reasoned Action that behavioural intention is the single direct predictor of behaviour. However, it can be argued that the original formulation of the Theory of Reasoned Action adequately explains the empirical evidence apparently supporting these challenges, and that findings contrary to the theory may result from inaccurate measurement of the variables involved, or by investigating behaviours which a priori would be deemed unsuitable for the application of the theory, in that they are not directly under volitional control.

The evidence and arguments presented above are provided to justify the choice of the Theory of Reasoned Action as the most suitable alternative for the present research. The following section reviews the literature regarding the role of social interactions in the adoption and maintenance of health-promoting behaviour, and concludes by proposing social interactions as a possible significant predictor of behavioural intention and actual behaviour in addition to those variables contained in the Theory of Reasoned Action.

2.3. Social Interactions and Health

Research into the relationship between social interactions and health is widespread through the health psychology literature. The emphasis has been on differentiating the effects of social support on health status either as a main effect, or as a buffer to life stressors (Cohen & Wills, 1985). The aim of this present study, however, is the investigation of the role of social interaction in determining the continued performance of a specific health-related *behaviour*. Rather than simply attempting to indicate the existence of a relationship between social interactions and behaviour alone, the pathway through which this relationship is effected is also explored. To enable this, self-reported social interactions are entered as an additional variable to the Theory of Reasoned Action. Social interactions are firstly proposed as affecting intention in addition to the effect of attitude and subjective norm, and secondly as affecting behaviour in addition to behavioural intention. This section reviews reviews research into the relationship between social interactions and health related behaviour.

Social support has been proposed as having a direct effect on the state of physical and psychological health an individual experiences (Henderson, 1980). One large scale study, the Almada County study (Berkman & Syme, 1979), found that the incidence of mortality was higher amongst those lacking in social bonds, even when variables such as socioeconomic status, initial health, alcohol intake, obesity, physical activity and smoking were taken into account.

An alternative to social support having a direct effect on health is the suggestion that the significance of social support is only, or mainly, as a buffer against life stressors. According to this view, social support only affects health insofar as it interacts with stressful life events, having no independent effect (Cobb, 1976).

While there is considerable debate as to the relative merits of the main effect versus the buffering effect of social support on health, the role of health promoting and

health-risk behaviours as intermediate stages between social interactions and health is seen as crossing both these theoretical points of view (Cohen & Wills, 1985). This present research addresses the relationship between social support, or rather the more general concept of social interactions, and health-related behaviours. As such, the debate over a direct effect on health is not addressed. The research focusses on whether there is support for the view that social interactions affect health-related behaviour directly, or are mediated by variables proposed as determinants of behaviour by the Theory of Reasoned Action.

The term social support encompasses a range of social interactions and has been measured by a variety of different techniques. Cobb (1976) defines social support as information which leads a subject to believe that they are either cared for or loved, esteemed and valued, or belong to a network of communication and mutual obligation. The emphasis here is on the appraisal the individual makes of their social environment, rather than a simple reporting of events. A further definition proposed by Caplan (1974), involves the mutual fulfilment of psychological needs by the individuals involved in the interaction. Contrasting with these phenomenological definitions, determining the size of the individual's actual social network has formed the basis of much research in the area of social support (Asher, 1984; Langlie, 1977). This approach, while helping to determine the significance and source of supportive relationships, does little to explain the nature of such relationships. That is, the specific behaviours which make an interaction supportive or otherwise are not identified (Colletti & Brownell, 1982).

In reviewing 14 different measures of social support, O'Reilly (1988) identified the common elements employed in determining these measures as involving an interaction where particular actions or behaviours can have a positive effect on an individual's social, psychological or physical well being. O'Reilly (1988) found that most measures suggested that cognitive, affective and instrumental dimensions should be considered in determining the form the interaction takes. Schumaker and Brownell (1984), in an article aimed at developing a theoretical basis for social support investigations, suggest more precise labels for the three classifications identified by O'Reilly (1988). They propose that all the resources associated with support may be classified under the headings of either information, emotional sustenance, or tangible assistance. These three categories were employed in the item generation of the Inventory of Socially Supportive Behaviours (ISSB) developed by Barrera, Sandler, and Ramsey (1981). Barrera et al. (1981) emphasised the terms guidance, expressions of esteem, and tangible assistance to describe these three categories. These authors proposed that social support may be constructively operationalised as actual supportive behaviours provided by others for a particular individual. Such a measure enables the identification of the specific components of an individual's social interaction which are related to physical or psychological well being. Barrera et al. (1981) report a test-retest correlation for the ISSB of 0.88 with test-retest correlations for individual items ranging from 0.44 to 0.91. Coefficient alpha for the first and second tests were found to be 0.93 and 0.94 respectively. The authors included items with item total correlations less than 0.3, due to the possibility that they may be more frequently endorsed in further samples. They emphasise the need to differentiate between the different theoretical approaches to social support. Firstly, the network approach, which determines the number of potentially or

actually supportive others an individual has contact with. Secondly, the individual's perception of the degree of support provided by his or her social environment. Thirdly, the approach exemplified by the ISSB, where the number of supportive interactions actually received is reported. Correlations of the ISSB with measures of the first two of these approaches were low ($r = 0.32$ and $r = 0.35$) but significant. This is seen by Barrera et al. (1981) as evidence that these are three related but distinct measures of the latent variable of social support. Barrera (1986) gives clear definitions of these three aspects of social support, naming them as social embeddedness, perceived social support, and enacted social support, and again emphasising the need to view them as largely independent. He proposed that maintaining this distinction will enable both improved internal consistency of measures, and a more useful interpretation of research findings.

Walkey, McCormick, Seargent and Taylor (1987) suggest that the ISSB is unique in measuring actual supportive behaviours. These authors propose that an important aspect of the ISSB is that it can be employed to differentiate supportive behaviours into categories. The importance of these different categories in determining health status, they suggest, may vary with the differing stressors experienced. In a review of the literature Walkey et al. (1987) find the most support for the ISSB containing the three factors of tangible assistance, directive guidance, and emotional support. Using a technique which employs the replication of factors across different groups, these authors found further confirmation of these three factors first proposed in the initial development of the scale.

2.3.1. Social Support and Health-related Behaviour

Even with the diversity of measures and definitions of social support, there is overall agreement that it plays an important part in the acquisition and maintenance of health-related behaviour. This section reviews studies ranging over different health-related behaviours and incorporating a variety of definitions of social support.

A number of papers have found evidence for a link between social interactions and general measures of health-related behaviour. Langlie (1977) found that a social network characterised by high socioeconomic status and frequent contact with non-kin, was positively associated with general health-promoting behaviours such as the use of seat belts, health screening, medical and dental care, exercise and some nutritional behaviour. Hubbard, Muhlencamp and Brown (1984) employed a measure of perceived social support with high internal reliability (0.89) and correlations with other criteria ranging from 0.3 to 0.44 ($p<0.001$). A further questionnaire measured six health-related practices. The six behaviours investigated were nutrition, exercise, relaxation, safety, substance abuse, and prevention practices. Hubbard et al.(1984) found that their measure of social support accounted for 14% of the variance in a health behaviour questionnaire given to 97 senior citizens. These authors found that the amount of variance accounted for increased to 34% in a group of people attending a health fair. This paper was primarily written for nurses, and concludes that the service provided by this profession would benefit from an increased awareness of the role of social support in achieving positive health practices.

In an analysis of the United States National Health Survey, Gottlieb and Green (1984) found evidence that social networks affect health mainly indirectly through their effect on health behaviour. The validity of the measures employed in this survey was reduced through the necessity of using simple questions able to be answered in a telephone interview. However, social network size was found to have a significant effect on alcohol consumption, smoking, and hours of sleep for both males and females. Aspects of the social network were found to interact differently with a number of health behaviours. For example, being married negatively affected the amount of physical activity in men while group participation had a positive effect on the same behaviour. While not addressing the type of social interaction involved, these findings indicate the need to identify the different aspects of social interactions which may affect health-related behaviour.

There is considerable empirical support for a relationship between social support and specific health-related behaviours. Most research in this area has investigated either weight loss, alcohol intake, or cigarette smoking. Cooke and Meyer (1980), in a literature review of variables predicting weight loss, found that social support was one of three factors associated with positive outcome. Further evidence has been reported by Miller and Simms (1981) who determined that the degree of social support was positively associated with long term success in a residential weight loss program. A similar relationship with long term success was found by Brownell, Heckerman, Westlake, et al., (1978). These authors assessed the results of a highly structured program for both dieters and dieters' spouse which included mutual monitoring of eating and activity patterns, stimulus control, modelling, and reinforcement of appropriate behaviour. At the completion of treatment, no difference was found between the group receiving this treatment and two control groups. However, at six month follow up, the experimental group had significantly greater weight loss than the other two groups.

While laboratory experiments are quite scarce in this area, two investigations (Rosenthal & Marx, 1979; Rosenthal & McSweeney, 1979) found that subject's speed of eating and quantity of food consumed were directly affected by the rate and amount eaten by an experimental confederate. Similar experimental findings have been obtained in relation to alcohol intake. Collins, Parks and Marlatt (1985) found that a sociable role model's rate of consumption of alcohol had a positive correlation with the rate of consumption by the subjects. However, an unsociable role model was associated with high consumption rates by the subject, irrespective of the rates maintained by the model. These findings strongly suggest the mediation of the effect of social interactions by some kind of psychological filter brought to the situation by the subject.

Several studies have indicated that type of social interaction may affect success in the treatment of alcoholic patients. At six month and two year follow up, Finney, Moos and Newborn (1980) found that a better prognosis for treated alcoholics was positively associated with the following dimensions of family interaction: an active recreational orientation, a low degree of family conflict, and a relatively high proportion of family duties performed by each of the family members. Marlatt and Gordon (1980), in a study of relapse in smoking, drinking, and heroin use, found that 43% of all relapses took place in situations involving both positive and, in particular, negative social

interactions. The degree of peer modelling of smoking, alcohol use and physical activity was found by Gottlieb and Baker (1986) generally to have the strongest relationship to subject behaviour of any factors employed in their analysis. Relapse after smoking cessation was associated with friends' negative modelling (such as smoking in front of a quitter, or offering them cigarettes) at two, three and eight weeks post cessation (Morgan, Ashenberg & Fisher, 1988). The addition of a social support component to a behavioural intervention program reduced smoking relapse at three but not six month post cessation (Hamilton & Bornstein, 1979). However, a positive effect at six months was found by including a social consequence of smoking in a study by Lichstein and Stlgaitis, (1980). These authors' treatment included a condition that when one partner smoked, a consequent cigarette was to be smoked by the other.

Although limited by sample size, Stanton (1987) employed a causal modelling procedure to determine the relationship between health and hypertension locus of control, knowledge of treatment regimen, social support and adherence to medical regimens by hypertensive patients. The social support measure developed by the author had a coefficient alpha of .75 and consisted of a five item scale which assessed perceived tangible and perceived affective support. The results of this study indicated that perceived social support along with internal locus of control for health and hypertension and knowledge of the medication regimen were all significant contributors to regimen adherence, and that this in turn facilitated diastolic blood pressure change.

2.4. Social Interactions and the Theory of Reasoned Action

While this review of the literature suggests a strong and consistent relationship between social interactions and health-related behaviours, there is a noticeable lack of investigations of the pathway through which this effect is produced. For example, is the effect of social interactions on behaviour mediated through intra-psychic variables, or is there a direct effect, irrespective of the predisposition of the individual performing the behaviour? This question may be significant in increasing the effectiveness of interventions aimed at improving the maintenance of health-related behaviour change. The presence of a direct effect for example may help explain poor maintenance even in those who express a firm commitment and are highly motivated. The present research addresses this question by determining the relationship between social interactions and the various cognitive, affective, connative and behavioural components proposed by the Theory of Reasoned Action.

Following the requirements of the Theory of Reasoned Action for the behaviour studied to be under volitional control and the suggestion by Ajzen (1985) that a low sodium diet would constitute a suitable behaviour, the extent of adherence to such a diet was chosen as the dependent variable for the current work. The term 'volitional control' is originally employed by the Theory of Reasoned Action as defining a state which is either present or absent, although Ajzen (1988) suggests that control over behaviour can best be described as existing on a continiuum. This alternative view of volitional control was earlier proposed by Liska (1984), who suggested that behaviours are not *either* volitional or involitional, but vary in degree across a continuum.

According to Liska (1984), behaviour with a high inter-individual variation in intention and a low inter-individual variation in resources would be best predicted by a measure of intention. A behaviour with the reverse relationship would be best predicted by a measure of available resources. These resources are defined as the individual's skills, abilities and opportunities, as well as the degree of social cooperation experienced. Following the example of a low sodium diet, there would be little individual variation in the skills or abilities necessary to perform the target behaviour (eating food). It is highly likely, however, that there would be considerable difference in the degree of social cooperation experienced. This would then leave social cooperation as the major addition to the volitional components of the Theory of Reasoned Action. For this particular behaviour, and employing a similar rationale, the level of social cooperation would also constitute the major component of the construct of perceived behavioural control as proposed in Ajzen's (1985) Theory of Planned Behaviour.

A construct similar to social cooperation was proposed by Grube, Morgan and McGree (1986). In an investigation of smoking intentions and behaviour, they included a measure of a variable they term 'behavioural norms'. These behavioural norms are defined as an individual's perception of significant others' actual behaviour, a concept which appears similar to that measured by the Inventory of Socially Supportive Behaviours (ISSB) developed by Barrera, Sandler, and Ramsey (1981), and discussed earlier in this Chapter. Grube et al. (1986) found that their data supported the addition of this variable to the Theory of Reasoned Action, both in the prediction of behavioural intention and actual behaviour. They concluded: 'At the very least, the findings reported here indicate that these sources of interpersonal influence should be considered in future applications of the Theory of Reasoned Action.' (Grube, Morgan & McGree, 1986, p. 91)

This current study investigates the relationship between social interaction and the variables proposed by the Theory of Reasoned Action within the context of a longitudinal study of sodium intake. The timing of data collection within the study enabled the investigation of short and longer term maintenance of a newly acquired health-related behaviour. The review of social support and health related behaviours (Section 2.3.1. above) indicated that the significance of social interactions may vary at differing points of the maintenance stage. The longitudinal analysis employed here allows for investigation of this.

A recent study of current activities aimed at reduction in cardiovascular risk factors in the Australian community (Report of the Cardiovascular Health Risk Management Service, 1990) found that the majority of interventions both community and clinic based were mostly short term - carried out during the change and and short term maintenance periods only. It is unlikely, given the high cost, that intervention in other areas of health-behaviour change would include a markedly greater frequency of contact during the long term maintenance period. Therefore, even though there is an increasing awareness of the need to incorporate activities aimed at long-term maintenance into health-behaviour change programs, the actual contact with the health professional (and the greatest impact of this contact) occurs during the change and short-term maintenance stage. Consequently, this research focuses not only on the relationship between present social interactions and contemporaneous intentions and behaviour but also in relation to intentions and actual behaviour occurring in the future, that is long term maintenance.

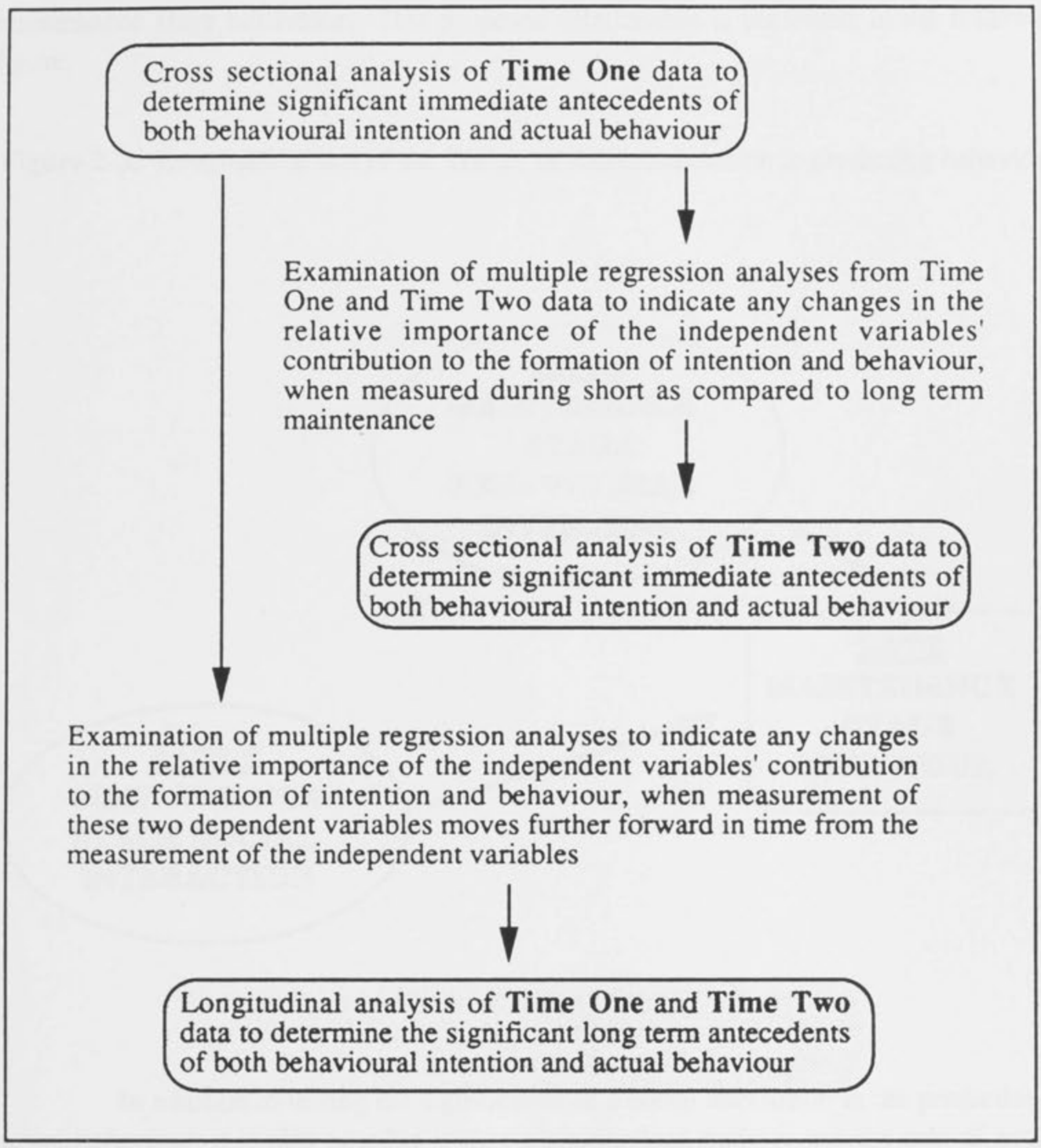
To enable the investigation of the relationship between social interactions and the Theory of Reasoned Action variables and actual behaviour at both short and long term maintenance, data from this research is analysed in the stages shown in Figure 2.2.

According to the Theory of Reasoned Action all independent variables determine behaviour only through their effect on forming intention. The apparent ability of some 'other variables' independently to predict behaviour is seen by the theory as a result of a discrepancy between measures of intention and behaviour and not as an indication of any direct causal link between behaviour and variables external to the model. Ajzen and Fishbein (1980; Ajzen, 1985) suggested that a discrepancy between the measures of intention and behaviour is due to one or more of the following three factors: a lack of correspondence between the measures on the four dimensions of action, target, location and time; changes in intention due to changes in attitude or subjective norm occurring between measuring the intention and the behaviour; when the behaviour is not directly under volitional control - 'volitional control' occurs where the performance of a behaviour is directly under the conscious control of an individual and not resulting from some overlearned response to a conditioned stimulus, or forced on an unwilling actor by environmental factors.

The Theory of Reasoned Action proposes that, where the performance of behaviour is under volitional control, behavioural intention is the immediate antecedent and best predictor of behaviour. A measure of any variable extraneous to the model, such as social interactions, taken at the time of the performance of the behaviour, may well add significantly to the prediction of that behaviour over and above that contributed by the behavioural intention measured at some point prior to the performance. However, this would only occur if this social interaction had altered the intention in the intervening time period. According to the Theory of Reasoned Action, a measure of intention taken after the measurement of the significant social interaction and close to the performance of the behaviour would account for more variation in the performance of a behaviour than a measure of intention taken at some point prior to the measurement of the extraneous variable. The inclusion of this intention measure should also reduce the regression coefficient of the extraneous variable to zero in the prediction of Time Two behaviour.

It would follow from the theory that the initial intention *and* the social interaction would both be significant predictors of a measure of intention at Time Two. A measure of behavioural intention at Time Two would, however, still be the best single predictor of behaviour following this second measurement of intention.

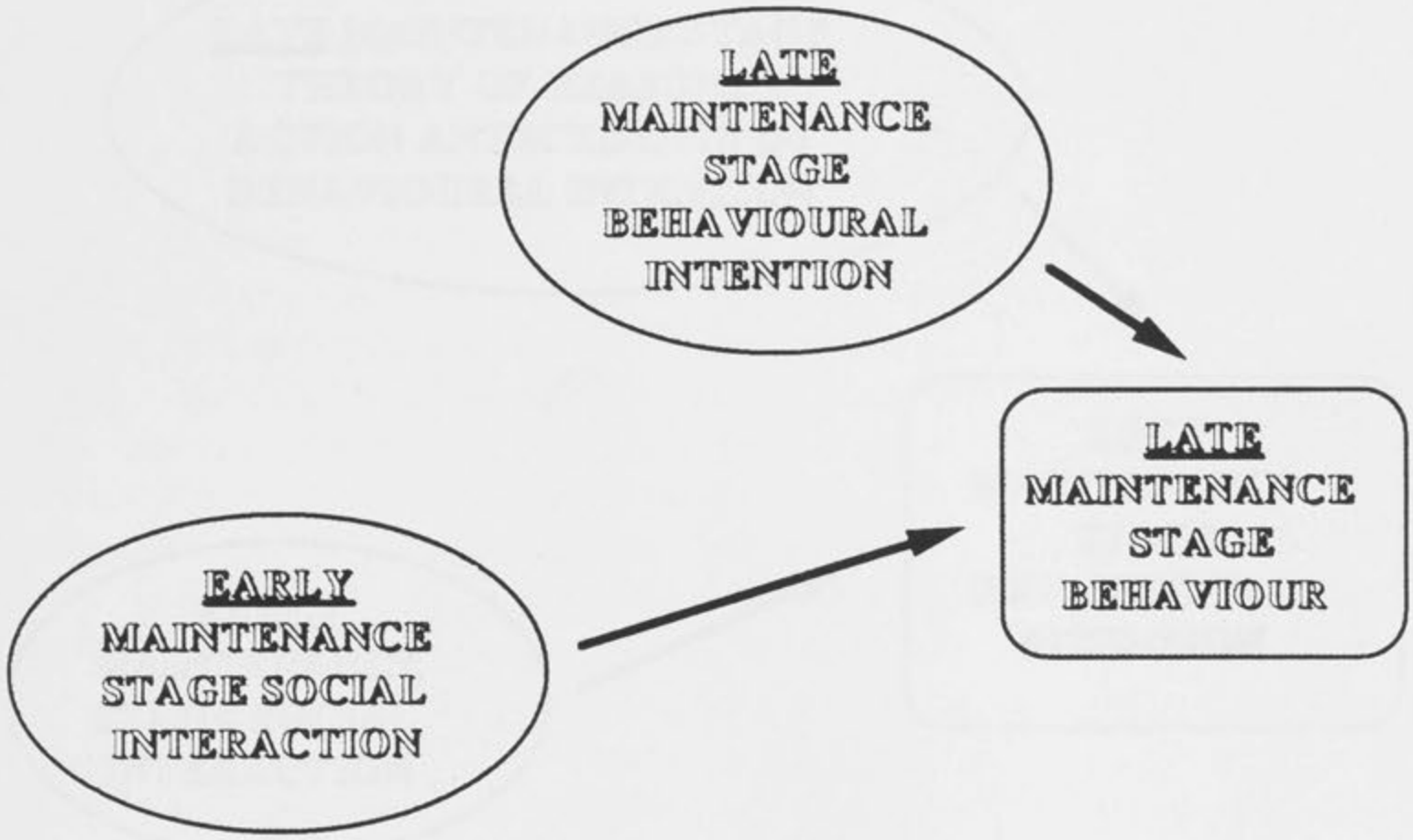
Figure 2-2: Sequence of Data Analysis



The measurement of variables at different points in time, as suggested here, would allow a test of the role of social interactions in the Theory of Reasoned Action. If, as the Theory of Reasoned Action proposes, social interactions affect behaviour *only* through behavioural intention, then the relationships described immediately above would occur. That is, a measure of social interaction may be significant in the prediction of Time One behaviour over Time One intention alone, but not in Time Two behaviour over Time Two intention alone. However, if this variable had an effect on behaviour independent of behavioural intention, its measurement at Time One as described above, could be expected significantly to predict Time Two behaviour controlling for Time Two intention. Stated in terms of a multiple regression formula, this challenge to the Theory of

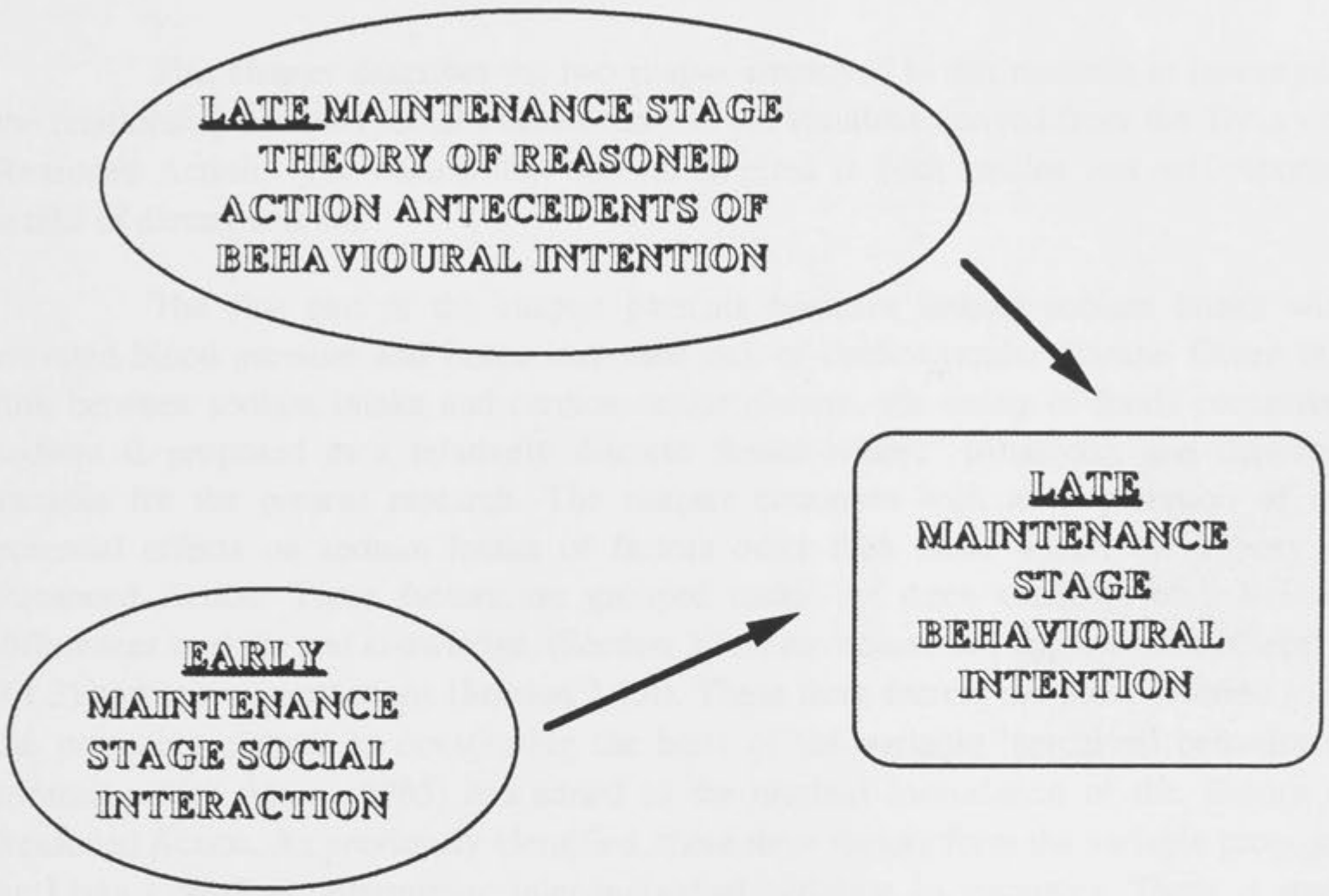
Reasoned Action would predict that a measure of social interactions taken in the early maintenance stage (i.e. Time One) would achieve a significant weight when entered with behavioural intention from the late maintenance stage in a multiple regression onto late maintenance stage behaviour. This proposed relationship is presented in the following figure.

Figure 2-3: Longitudinal test of the Theory of Reasoned Action in predicting behaviour



In addition to testing the significance of a social interaction in the prediction of actual behaviour, it is also possible within a longitudinal study to test the role of such a variable in the formation of the behavioural intention. Given that the Theory of Reasoned Action states that all variables affect intention only through attitude or subjective norm, a measure of a social interaction taken at Time One, should not be a significant predictor of intention at Time Two, when the effect of attitude and subjective norm are taken into account. This additional test to the Theory of Reasoned Action would involve performing a multiple regression of social interactions at Time One with attitude and subjective norm at Time Two onto behavioural intention at Time Two. For this challenge to the theory to be supported a significant weighting for Time One social interactions would be expected in the multiple regression, suggesting a direct effect on intention, not as the theory would state, mediated through affect and subjective norm. This proposed relationship is presented in the following figure.

Figure 2-4: Longitudinal test of the Theory of Reasoned Action in predicting behavioural intentions



The findings of the present research, in relation to the above two specific tests of the Theory of Reasoned Action, are discussed in Chapter Eight.

Chapter 3
THE RESEARCH SETTING

This chapter describes the two studies employed in this research to investigate the relationship between social interactions and the variables derived from the Theory of Reasoned Action. The behavioural domain targeted in both studies was self reported intake of dietary sodium.

The first part of the chapter presents evidence linking sodium intake with elevated blood pressure and hence increased risk of cardiovascular disease. Given this link between sodium intake and cardiovascular disease, the eating of foods containing sodium is proposed as a relatively discrete 'health-related' behaviour, and therefore suitable for the present research. The chapter continues with an exploration of the potential effects on sodium intake of factors other than those within the Theory of Reasoned Action. These factors are grouped under the three headings of individual differences in skills and knowledge, (Section 3.1.2) environmental opportunities, (Section 3.1.3) and social interactions (Section 3.1.4). These three factors are those referred to in the preceding chapter as constituting the basis of the variable 'perceived behavioural control' which Ajzen (1985) has added to the original formulation of the Theory of Reasoned Action. As previously identified, these three factors form the variable proposed by Liska (1984) as determining inter-individual variation in resources. There is some support for the importance of these three factors in addition to those proposed by the Theory of Reasoned Action. It is argued below that because of the nature of the subjects and the behavioural domain investigated, the first two factors, differences in skills and knowledge and environmental opportunities, would evidence little inter- individual variation. While accepting the theoretical importance of the additions proposed by Ajzen and also by Liska, it is likely that only the factor involving social interactions would be of significance in this data set, thereby justifying this as the only variable additional to the Theory of Reasoned Action employed in this study. An overview of the sequential development of the measures employed in both studies concludes this chapter.

3.1. Dietary Sodium and Hypertension

Intake of dietary sodium is the specific behavioural domain employed to test the relationship between social interactions and the Theory of Reasoned Action. The recommended level of dietary sodium in the Australian diet (National Health & Medical Research Council, 1982) is between 40 and 100 mmol per day (1mmol of sodium = 23mgms). The current average daily sodium intake is around 150 mmols. (Beard & Heller, 1987) considerably higher than the recommended level. There is a substantial

body of evidence implicating this high level of sodium intake in the aetiology of hypertension. From the beginning of this century up to the introduction of diuretic medication in the 1950's, a low sodium diet was widely employed as a treatment for this condition (Jennings, 1985). Approximately twenty percent of the Australian population is estimated to have hypertension or borderline hypertension. With only half this number actually being diagnosed and the common treatment being hypertensive medication, the cost in monetary terms is one of the largest single items in the national health expenditure (Australian Initiute of Health, 1989). Combining this expenditure with the overall cost in terms of illness and premature death, a relatively cheap alternative such as eliminating dietary sodium makes sound economic and health sense (Beard & Heller, 1987). However, reducing sodium intake to an acceptable level requires a far greater behaviour change than simply leaving the salt cellar off the table. Salt added in cooking or at the table (termed discretionary sodium intake) constitutes about fifteen percent of daily intake of sodium, with naturally occurring sodium compounds in food contributing a further ten percent. The majority of dietary sodium is obtained from manufactured goods which have had one or more of the 34 allowable food additives containing sodium added during the manufacturing process (James, Ralph & Sanches-Castillo, 1987). Therefore, to enable a reduction in dietary sodium to a level which may reduce the incidence of disease requires the avoidance of many manufactured goods or a shift to a low sodium variety of the same item.

The subjects employed in this research were taken from a group of individuals who had decided for a range of health reasons (either treatment or prophylaxis), to aim at eliminating all added sodium from their diet. Such a diet is commonly termed 'salt free'.

Two separate cohorts were studied. One taken from subjects participating in the Canberra Blood Pressure Trial (CBPT), and the second taken from the Low Sodium Clinic (LSC), a service which was commenced following the conclusion of the trial. The intention of the CBPT was to act as a pilot study for a large scale community-based investigation of the hypothesis linking the intake of sodium with the incidence of hypertension. As such the aim was to establish an acceptable, palatable diet as an alternative to the normal high sodium intake of the Australian public. A further aim was to determine the willingness of a group of individuals to maintain such a diet for the period necessary for such a large scale investigation. The four month intervention described in the following section was aimed at adopting and maintaining a low sodium diet and was similar for both the CBPT and the subsequent low sodium clinic.

3.2. Individual Differences in Skills and Knowledge

The main aim for each patient was to avoid all added sodium in the diet. This required not only ceasing the addition of sodium to food during cooking or at the table (described as discretionary sodium), but also avoiding all food with sodium added in the manufacturing process (non-discretionary sodium). Each subject attended eight, thirty minute, one-to-one counselling sessions with a nurse educator. During these sessions, advice was given on preparing low salt meals and where low salt manufactured goods could be purchased. The subjects also received feedback on how well they were avoiding

sodium by means of an estimate obtained from potassium/sodium ratio of a first morning specimen of urine. The nurse educators also provided general supportive counselling for the behaviour changes necessary.

At the end of the four month intervention period the subjects ceased regular contact with the clinic. They were told that they could contact the clinic again if they wished for updated information on the availability of low sodium food products, or a comparison of the blood pressure readings obtained by their general practitioner with the clinic automatic blood pressure machine. Only a very small number of the overall clinic attenders returned for any of these services. At their second last or last scheduled clinic visit, subjects were asked if they would be willing to participate in the present study. Those who agreed then completed the questionnaires shown in Appendices B, C, and D. The subjects were also required to provide one further urine specimen and told they would be recontacted in six months time. The subjects were all recontacted between six to eight months later, and were required to complete similar questionnaires, and to complete two weeks' data collection with the Sodium Intake Checklist (see Chapter Four).

The two groups employed in this research are not intended to be representative of the general population, but rather of individuals attending a clinic for behavioural intervention for control of health risk factors. That is, individuals who have indicated by some observable behaviour (in this case attending a clinic) that they wish to carry out a health-promoting behaviour (a low salt diet), and are fully aware of the ramifications of their choice of action.

As all of the subjects received identical information and a similar interaction with the nurse educator over the four month intervention, they can be viewed as relatively homogeneous in terms of their knowledge of the requirements of adhering to a low sodium diet. This low inter-individual variation in skills and knowledge of the target behaviour would reduce this factor's potential to create differences in the performance of that behaviour. Therefore, within this subject group, the addition of a measure of this variable to the original formulation of the Theory of Reasoned Action was not considered justified.

The following section argues against the inclusion of a further factor proposed by Liska (1984) and Ajzen and Madden (1985) as an independent contributor to behavioural intention and behaviour - that of the differences in opportunities to perform the behaviour due to environmental factors

3.3. Environmental Factors Contributing to Individual Variation

The inland city of Canberra, in which the trial was carried out, has a population of approximately 280,000 and is isolated from any other major population center. Prior to the commencement of this research, considerable effort had been expended to ensure the availability of low sodium manufactured goods (bread, cheese canned goods etc) within the community. Shopping in the Canberra area is mainly carried out at centres designated specifically for retail trade. Within these shopping centres, grocery shopping

occurs largely in a few chains of supermarkets. Given the comparatively small population and geographical isolation, there is only a small number of wholesalers supplying these supermarket chains. Therefore, the distribution of products, and of particular significance low sodium manufactured goods, is relatively uniform throughout the region. It is proposed that there is no a priori reason for including variations in opportunity due to availability in the analysis of factors contributing to variations in sodium intake for this target group.

3.4. Social Interactions and a Low Sodium Diet

The discussion of social interactions and the Theory of Reasoned Action in Chapter Two contains the suggestion by Liska (1984) that there is an inverse relationship between the significance of intentions and that of resources in determining the actual occurrence of a behaviour. To reiterate the components of resources proposed by Liska (1984) are the individual's skills, abilities, the opportunity to perform the behaviour and the degree of social cooperation experienced. Within the subjects employed in the two studies of this research, social cooperation would appear the most significant in relation to maintenance of a low sodium diet. The four month training in shopping, cooking, and monitoring dietary sodium, and the relative uniformity of availability of low sodium products would considerably reduce intraindividual variation in the three areas of skills, ability, and opportunity. It can be argued that the three variables would be of minor significance in affecting dietary sodium intake in the two cohorts studied in this investigation. The remaining component proposed by Liska (1984) and Ajzen and Madden (1985) is the degree of social cooperation experienced by the respondent. This suggestion is given weight by anecdotal evidence from participants in the CBPT many of whom suggested that this factor did affect the degree of adherence to a low sodium diet.

3.5. Summary of Preceding Sections

This chapter has provided an explanation of the dependent variable (sodium intake) employed in this research. A justification has been given for describing this behaviour as largely under volitional control, and hence suitable for an examination of the Theory of Reasoned Action.

The three components of variables proposed by Ajzen (1985) and Liska (1984) as additions to the Theory of Reasoned Action have been explored as they relate to this particular behavioural domain. It has been argued that for this subject group, only the component of social cooperation is likely to provide a significant contribution.

The following section contains an overview of the sequential development of variables employed in the CBPT and the LSC studies, both those derived from the Theory of Reasoned Action and the additional variable of social cooperation. A detailed description of the development of these measures is provided in the following chapters.

3.6. Data Collection and the Development of Measures for Both Studies

The Theory of Reasoned Action was operationalized for the first longitudinal study of the CBPT participants according to the directions specified by Ajzen and Fishbein (1980). For the first study the ISSB (Barrera, Sandler, & Ramsey 1981) was employed as a measure of social support. The initial wave of data collected from the CBPT participants employed the potassium/sodium ratio in a morning specimen of urine as the dependent variable. This proved to be inadequate as a measure of dietary behaviour leading to the need to establish a reliable and valid alternative measure. This alternative measure, the Sodium Avoidance Checklist, was then employed as the dependent variable in all subsequent investigations. The second longitudinal study was carried out using participants from the Low Sodium Clinic. The measures employed in this study were similar to those employed in Study One with the addition of several items to the expectancy/value attitude scale, and the expansion of the affective measure of attitude and a corresponding expansion of the measures of behavioural intention. An additional social interaction scale was developed. This scale measured the self report of positive and negative social interactions particularly relating to the maintenance of a low sodium diet. This scale was termed the Sodium-related Social Interaction Scale. The development of these measures and the data collection for both studies occurred in the following sequence.

Figure 3-1: Time Sequence of development of measures and data collection

- THE DEVELOPMENT OF STUDY ONE THEORY OF REASONED ACTION MEASURES AND THE CHOICE OF THE SOCIAL SUPPORT SCALE AND DEPENDENT VARIABLE.

- STUDY ONE, TIME ONE DATA COLLECTION.

- RELIABILITY AND VALIDITY STUDY OF THE DEPENDENT VARIABLE (THE SODIUM INTAKE CHECKLIST).

- STUDY ONE, TIME TWO DATA COLLECTION.

- THE DEVELOPMENT OF STUDY TWO THEORY OF REASONED ACTION MEASURES AND THE SODIUM-RELATED SOCIAL INTERACTION SCALE.

- STUDY TWO, TIME ONE DATA COLLECTION.

- STUDY TWO, TIME TWO DATA COLLECTION.

This developmental sequence is generally adhered to in the material presented in the remainder of this thesis.

Chapter 4
THE DEVELOPMENT OF STUDY ONE VARIABLES

4.1. Theory of Reasoned Action Components

4.1.1. The Expectancy Value Attitude Measure

The items for the expectancy-value attitude measure were obtained from responses given by 45 Canberra Blood Pressure Trial (CBPT) participants to the three following open ended questions (see Appendix A):

1. WHAT ARE THE ADVANTAGES OF A GREATLY REDUCED SALT INTAKE?
2. WHAT ARE THE DISADVANTAGES OF A GREATLY REDUCED SALT INTAKE?
3. IS THERE ANYTHING ELSE YOU ASSOCIATE WITH A LOW SALT DIET?

These responses were grouped according to content, and any grouping with five or more respondents was chosen for inclusion, resulting in the selection of the following twelve items.

Eating low sodium food ....

1. WILL REDUCE HIGH BLOOD PRESSURE
2. CAUSES DIFFICULTY WHEN DINING OUT
3. RESULTS IN AN INCREASED APPRECIATION OF THE FLAVOR OF FOODS
4. MEANS TAKING MORE TIME IN FOOD PREPARATION
5. WILL PREVENT HIGH BLOOD PRESSURE
6. WILL REDUCE MEDICATION FOR HIGH BLOOD PRESSURE
7. REDUCES THE RISK OF HEART ATTACK/STROKE/OTHER MEDICAL PROBLEMS
8. RESULTS IN HIGHER FOOD COSTS
9. MAKES IT HARD TO PROVIDE ACCEPTABLE FOOD FOR VISITORS
10. IS BORING
11. IMPROVES ONE'S AWARENESS AND INTEREST IN FOOD
12. MEANS FRIENDS WILL PUT PRESSURE ON ME TO STOP

These items were presented first as a group of outcome-expectations, scored one to seven from low to high expectations. The same items were also presented for an evaluation from good to bad scoring +3 to -3. For example, one pair of these items consisted of an outcome expectation: 'Eating low sodium food will reduce high blood pressure' and an evaluation 'For me, reducing high blood pressure is...'. The sum of the product of these two sets of scales formed the expectancy/value attitude measure.

One possible explanation for the inconsistent findings reported in tests of the Theory of Reasoned Action may lie in the different scales employed to measure the expectancy value attitude variable. A large number of papers fail to report the scales employed, but of those which do, the choice is generally either both components being measured on a negative to positive dimension (-3 to +3), or a combination of one positive and one negative - as employed in this present research. The rationale for the choice made here is as follows.

The main reason for finding the first combination unacceptable (i.e. both scales positive to negative) is that one does not generally hold a negative probability that an event will occur. Often, the negative probability of an event occurring is nonsensical. For example the negative response to 'eating creamcakes will make me put on weight' may presumably imply that the respondent believed that carrying out the behaviour of eating cream cakes would result in their losing weight. It is, of course, possible to find a number of belief statements which may be seen as bi-polar. A statement such as 'eating low sodium food will *reduce* high blood pressure' would therefore be seen as carrying the implication that the result of eating low salt food would be to *increase* high blood pressure. The interpretation of this and the other sodium belief scales as bipolar is rejected primarily because they occurred only in the positive *or* negative sections of the responses employed for the selection of the items. For example, people mentioned the reduction of high blood pressure, but not its increase. If the decision is made that the obverse of a belief statement is to be included in an expectancy-value attitude measure, it would appear more suitable to include this as a separate item rather than assume its inclusion by simply scoring the original response on a bi-polar scale.

Employing a bi-polar evaluation and a uni-polar expectancy scale results in the following matrix.

	unlikely 1	2	3	4	5	6	7 *likely*
bad -3	-3	-6	-9	-12	-15	-18	-21
-2	-2	-4	-6	-8	-10	-12	-14
-1	-1	-2	-3	-4	-5	-6	-7
0	0	0	0	0	0	0	0
1	1	2	3	4	5	6	7
2	2	4	6	8	10	12	14
good 3	3	6	9	12	15	18	21

This combination places greater importance on the evaluative component as the perceived likelihood of the occurrence increases. In addition, an event which is of no

value to the respondent is seen as having no relevance to the overall attitude. The choice of this combination of scales is particularly relevant to the present population which is highly likely, because of the subjects' commitment to a low sodium diet, to hold fairly uniform positive or negative outcome beliefs regarding the target behaviour.

4.1.2. The Affective Attitude Measure

The Theory of Reasoned Action proposes that the affective response to carrying out the target behaviour is the main attitudinal antecedent of behavioural intention. Ajzen and Fishbein (1980) indicate that this affective component of their theory should be operationalised through the use of semantic differential scales relevant to the respondent's performance of the behaviour. The subjects in Study One were accordingly asked to rate the phrase 'for me over the next six months, avoiding eating food with sodium added would be...', using the following four semantic differential scales: good-bad; harmful-beneficial; pleasant-unpleasant; difficult-easy. The sum of the score on these four scales was then used in Study One as the affective measure proposed by this theory.

4.1.3. The Subjective Norm: Others' Opinion by Motivation to Comply

At the same time as responding to the open ended questions regarding the advantages and disadvantages of a greatly reduced salt intake, the 45 subjects were also asked the following questions:

1. ARE THERE ANY GROUPS OR PEOPLE WHO WOULD *APPROVE* OF YOU STAYING ON A GREATLY REDUCED SALT INTAKE?

2. ARE THERE ANY GROUPS OR PEOPLE WHO WOULD *DISAPPROVE* OF YOU STAYING ON A GREATLY REDUCED SALT INTAKE?

3. ARE THERE ANY OTHER GROUPS OR PEOPLE WHO COME TO MIND WHEN YOU CONSIDER STAYING ON A GREATLY REDUCE SALT INTAKE?

The responses to these questions were grouped according to content, and any grouping with five or more respondents was chosen for inclusion. This resulted in the selection of the following eight items: my doctor; my spouse; people interested in health; my family; organisations interested in health; people who usually disagree with me; food manufacturers; my friends. Respondents were asked to indicate on a seven point scale how likely these people were to 'think I should eat low sodium food'. The motivation to comply was then determined by obtaining a rating from -3 to +3 to the question 'generally speaking, I want to do what (my doctor, spouse etc.) thinks I should do'. The product of these two scales formed the items for the comprehensive measure of subjective norm.

A single measure of subjective norm was obtained by determining the product of the two scales: 'Most people who are important to me think I should eat low sodium food' and the motivation to comply with 'Most people who are important to me'.

Investigations employing the Theory of Reasoned Action vary in the method employed to measure the subjective norm component. The choice of scaling is reported even less frequently than for the expectancy/value attitude component. The rationale for the choice of scale employed to measure the subjective norm in the present research is similar to that discussed above in relation to the attitude measure. If a bi-polar scale were to be employed for the measurement of significant others' opinion, the meaning of the negative score in response to my (spouse etc) thinks I should eat low sodium food, would be the significant other advocating that I eat a high salt diet. It is more probable that the response of 'unlikely' indicates that the significant other would advocate eating the same as everyone else. While those advocating low salt diets may describe the average western diet as high salt there is no reason to believe that this is what is meant by a 'negative' response to this scale.

In a further departure from the operationalisation of the Theory of Reasoned Action described by Ajzen and Fishbein (1980), the evaluative component of the subjective norm has been omitted from the analysis in some studies. That is, the measure consists of the summed score of the scales of significant others' opinion only. This choice has been made in an endeavour to increase the size of the multiple correlation obtained in predicting the intention regarding the performance of a behaviour. It would appear inappropriate for the present research to employ this rationale for the production of items as there is little theoretical basis for such a choice.

4.1.4. Behavioural Intention

Three questions relating to behavioural intention were employed in Study One: one general question determining the intention to maintain a low sodium diet; one question relating specifically to intention to use discretionary sodium (to eat food with sodium added in cooking or at the table); and a third question determining intention to eat food with sodium added in the manufacturing process.

The behavioural intention score consists of the sum of the scores on each of these three scales. At Time One, Study One, the scales employed used the end points of 'likely' and 'unlikely' as proposed by Ajzen and Fishbein (1980). The results of this scaling (see Chapter Five) indicated very little variability between respondents. In an endeavour to increase sensitivity to individual differences, the underlying scale of the items was changed at Time Two, to range from 'about once a month' through to 'every day'. This scale resulted in a much wider spread of scores. The two behavioural intention measures employed at Time One and Time Two are, therefore, not identical. While it may well be that the Time Two scale is simply an expansion of one end of the Time One measure, a direct comparison of the scores cannot be made.

4.1.5. Social Interactions

This study employed the ISSB (Inventory of Socially Supportive Behaviours, (Barrera, Sandler & Ramsey 1981) described in Chapter Two. The ISSB was chosen for the following reasons. Firstly, it is one of the few scales available with reported reliability and validity. Secondly, the items relate to actual supportive behaviours carried out by people in the respondents' social context. This is in contrast to other social support measures which report on the size of the support network or satisfaction with the level of support.

4.1.6. General Comments on Study One Variables

The operationalisation of the Theory of Reasoned Action variables followed the instruction provided by Ajzen and Fishbein (1980). These instructions were followed in order to produce an accurate measure of the Theory of Reasoned Action against which to compare the addition of social support as a phenomenon affecting both behavioural intention and actual behaviour, over and above the other components of the theory.

While not specifically measuring the sodium related social support, a general social support measure was employed (the ISSB). A number of studies reported in Chapter Two indicate this measure's acceptable validity and reliability.

The following major section describes the difficulties in obtaining a suitable measure of the target behaviour, sodium intake. The rationale for and development of a self-report measure of sodium intake - the Sodium Intake Checklist - is provided.

4.2. The Behavioural Measure

The initial behavioural measure chosen was that of the potassium sodium ratio (K:Na) in a first morning specimen of urine. The choice of K:Na over actual sodium level was made for a number of reasons. Firstly, differences in body size, physical activity and metabolic efficiency cause extremely wide individual variations in the amount of food required for energy balance (Widdowson, 1962). As a result, one person may excrete only 50 mmol of sodium/ 24 hour while another, strictly adhering to the prescribed sodium level of processed and unprocessed food, will excrete more than 100 mmol/24 hour. As an index of individual dietary compliance, the absolute sodium excretion rate is therefore crude, a factor no doubt contributing to the commonly observed sex differences in electrolyte excretion rates. The findings in several studies (Beard, Cooke, Gray & Barge, 1982; Holbrook, Cottrell & Smith, 1984; Williams & Bingham, 1986) were that men excreted 30% to 40% more sodium than women, suggesting a large difference in total food consumption. However, the ratio of potassium to sodium was similar for both sexes, suggesting relative conformity in the choice of foods and discretionary use of added salt. The first morning specimen of urine was chosen over the total 24 hour collection due to the difficulty of collection and analysis of the latter. Once again, the measurement of the K:Na in the specimen overcame the problem of over or under-representation of a solute due to variations in concentration of the urine.

Due to two constraints it was not possible to continue to use the morning K:Na as an estimate of dietary sodium intake. Firstly the cost of analysis (approximately $15 per test) was borne by the CBPT for the first wave of this study, however this funding was not available for the second wave, or for the study of the Low Sodium Clinic. A factor which further prohibited this form of estimating dietary behaviour was the need for repeated measures over several weeks to enable a true picture of an individual's general diet to emerge. It has been proposed (Liu Cooper and McKeever, 1978) that an accurate measurement of dietary sodium intake requires at least 12 consecutive 24 hour total urine collections. Apart from requiring highly cooperative subjects, this form of analysis was ruled out on financial grounds. As an alternative measure of dietary sodium intake, a simple checklist of foods containing sodium was developed by the author. The remainder of this section contains firstly a review of the literature supporting the use of self-report measures of ingestion behaviour, and secondly direct evidence in support of the validity and reliability of the Sodium Intake Checklist.

4.2.1. Evidence in Support of Self-report Measures

The validity of self-reported alcohol consumption has been the focus of a number of reviews (Babor, Stephens & Marlatt, 1987; Midanik, 1982; O'Farrell & Maisto, 1987). There are three dimensions proposed by Midanik, (1982) as generally describing research in this area.

1. The type of population - clinical, general or 'special' (such as prisoners)

2. The type of behaviour - alcohol problems and alcohol consumption

3. The criterion used for validation
   -collateral report and spouse, workmates, etc.
   -official records - e.g. of drink driving offences
   -sales data
   -observational/chronological data

Even with this range in population, behaviour and criteria, the three reviews cited above conclude that self-report measures are generally valid and reliable with only slightly greater chance of under-reporting consumption than of over-reporting. There appears to be no reason to expect consistent bias in self-reported alcohol consumption other than under-reporting when the individual has an elevated blood alcohol level or when the respondent has a clear incentive to do so such as abstinence as a condition of parole or continued employment.

These reviews agree that while acceptably valid and reliable measures *can* be constructed, measurement is often made where this information is not known. In addition, a measure with 'acceptable' reliability and validity is not necessarily a good measure and any interpretation of results should be made with these parameters reported.

Self-report measures of other health-related behaviours have also proved acceptable. Petitti, Freidman and Kahn (1981) go so far as to suggest that within a

clinical setting, a self-reported measure of smoking should be employed as the criterion against which to validate physiological measures. This view is supported by a number of other writers (Bauman & Koch, 1983; Haley, Axelrad & Tilton, 1983). Self-report of cannabis use by 143 people attending treatment for multiple drug users produced strong support for the validity of this method of collecting data (Martin, Wilkinson & Kapur, 1988). The use of self-report measures of ingestion was supported by James, Paull, Cameron-Traub et al., (1988) in their investigation of caffeine consumption. These authors produced an estimate of intake in milligrams of caffeine obtained through multiplying the number of cups of a particular type of beverage drunk by the average milligram of caffeine in that beverage. This product was found to only add slightly to the simple self-report measure. One final example supporting the validity of self-report is provided by Heller, Tunstall Pedoe and Rose (1981) who found a significant prediction of plasma cholesterol from a short questionnaire of dietary fat intake.

4.2.2. The Validity of Measures Other than Self-report

The validity of a self-report measure has been challenged due to a poor correlation between that measure and some physiological estimate of the behaviour. This rejection of self-report is often not warranted. The physiological measure is frequently not validated against the behaviour or any other criteria. A review of the literature where these measures have been validated, often finds a poor relationship with other measures of behaviour or other more accurate (and usually more costly) physiological measures. Measures of sodium intake for example often consist of a single overnight urine sample, spot urine or morning specimen. At best the measure is amount of sodium in a single 24 hour urine collection (Pietinen & Tuomilehto, 1980), which while not totally accurate, does provide a good estimate of sodium intake for that day. However, given the daily variability found in sodium ingestion, any of these cross sectional measures would not reflect the true behavioural pattern. Liu et al (1978) suggested that nine 24 hour urine collections are needed for an accurate measure of the general level of sodium intake. This number of 24 hour collections is impractical in normal clinical practice or anything other than well funded research. As an alternative the collection of specimens across time would provide an estimate of general dietary sodium. The accuracy of these specimens as measures of 24 hour sodium excretion while acceptable is not particularly high (overnight Na correlation with a mean of three consecutive days r = .62 to .69 and K:Na ratio r = .53 to .58. Spot urine correlations with mean of three consecutive days Na: r = .43 to .47; K:Na ratio r = .20 to .25. Given the size of these correlations and accepting that the 24 hour collection is the more accurate representation of daily Na intake, there is little support for the use of either overnight or spot urine as the criteria against which to judge any self-report measures.

Research on biochemical measures of alcohol consumption have also produced low, albeit significant correlations. O'Farrell and Maisto (1987) report thirteen studies with correlations of actual alcohol intake to gamma-glutamyl transference (GGT) ranging from 0.5 to 0.07 with the majority less than 0.4. These authors report finding from liver clinic alcoholics a correlation of 0.69. They propose that as GGT is the most accurate biochemical marker, the use of such markers over or to the exclusion of self-report is

questionable. This conclusion is also reached by Bernadt, Taylor, Mumford and Smith (1982). These writers report that with what they propose was their most sensitive measure, GGT; that this measure failed to detect two thirds of excessive drinkers or alcoholics. They contrast this finding with three short interview techniques which identified nine of the ten diagnosed 'alcoholics', with a higher percentage of 'excessive drinkers' identified by two of these measures. The report by Petitti et al (1981) discussed above suggests a similar superiority of self-reporting over biochemical measures in determining cigarette smoking.

4.2.3. Conclusions Regarding Behavioural Measures

There are two general conclusions which seem supported by the research literature on self-report of health-related behaviours. Firstly, when well constructed self-report measures are employed within the population sample for which they were intended, they provide valid and reliable measures of the target behaviour. Secondly, biochemical measures are little better and frequently worse indications of the target behaviour than are self-report measures.

4.2.4. Development of the Sodium Intake Check-list

Questionnaires generally have shown a poor correlation with physiological measures of sodium intake (Pickering, 1980). The original questionnaire on salt intake that was introduced by Dahl and Love (1954) has been criticised for classifying subjects falsely into those who have a high or low intake of salt (Pickering, 1980) and a review of the literature concluded that there was no reliable and at the same time practical way of measuring an individual's true sodium intake (Pietinen & Toumilehto, 1980). It is still possible, however, to discover examples of published research which used similar questionnaires to classify patients (Pangborn & Pecore, 1982)

Several reasons may exist for a poor correlation between dietary questionnaires and urinary results. Often the physiological measures employed (for example spot or overnight urines) are only estimates of dietary intake of sodium. As discussed above, the correlations between these measures and the more reliable total 24 hour collection of urine vary greatly, accounting for a maximum of 60% of the variance in sodium excreted in the total 24 hour urine. It must also be remembered that the sodium level (or the K:Na) that is obtained from a 24 hour urine sample is itself only an estimate of dietary behaviour. There is no foolproof way to detect the undercollection or overcollection of a 24 hour sample, and the sodium intake may be temporarily higher than the excretion rate of urinary sodium due to premenstrual retention of sodium, or loss through sweat or faeces. A further possible reason for the poor relationship between physiological and questionnaire estimates of sodium intake may be that the latter usually attempts to estimate the general diet, for example 'over the past week' and then compares this with a single 24 hour or spot urinary analysis - serial samples from one individual usually show a wide variation over the course of a week (Liu et al, 1978). Furthermore, recall memory is employed more often by the questionnaires than is recognition memory from a check-list of specific foods. This has continued even though the superiority of recognition

memory over recall memory has been established experimentally for some time (Kintsch, 1968; Shepard, 1967). Finally, questionnaires often focus on discretionary sodium use, that is salt that is added in cooking or at the table, whereas most dietary sodium comes from manufactured foods that are salted before purchase (James, Ralph, & Sanchez-Castillo, 1987).

The foods that were named in the SIC were chosen to represent a comprehensive list of added sodium in a Western diet. The checklist score was obtained by summing the scores of all 21 items. Qualitative questions and fine tuning were omitted in an effort to obtain a simple measure of active avoidance behaviour. In an attempt to overcome the problem of unnamed sources of sodium, such as the edible seaweed that was reported by one Japanese subject, the final item of the checklist asked for 'any food not mentioned above'.

The discriminant validity of the SIC was tested with two different groups of subjects. One group consisted of 190 students who were attending a local tertiary college and who completed the checklist as part of a course requirement. The other group consisted of 40 volunteers from the CBPT. The sodium intake of this second group had been established to be well below that of the Australian average (Beard, Cooke, Gray & Ellem, 1984; National Health and Medical Research Council Report on the Working Party on Sodium in the Australian Diet, 1984). In addition to completing the SIC, this group also collected 24 hour urine samples and morning urine samples.

The 190 college students were asked to complete one SIC at the end of one of their lectures. Each student gained a credit point for their participation in the study.

Subjects who were in the CBPT group were first asked to collect a urine sample as follows. On the day that was appointed, they discarded the first morning urine, but noted the time carefully. The total urine that was passed for the next 24 hour was collected in one large container, except for 10 to 15 ml of the second morning urine, which was collected in a small, separate container. The second-morning urine sample was collected at the same time of day as the first voiding. The 24-hour and second-morning sample was delivered to the CBPT office on the second morning, and the subjects completed an SIC when he or she delivered the samples. In the laboratory, urinary sodium and potassium levels were measured on a Beckman Autoanalyzer (Beckman Instruments, Palo Alto, California, USA) by means of ion specific electrodes.

The SIC scores of the college students had a mean of 27.92 (SD, 12.6) and a range of 2 through to 74. The Cronbach alpha for the scale was 0.75. The mean SIC for the 40 trial subjects was 11.89 (sd, 12.21), with a range of scores of 0 - 40. All the 24-hour urine samples were judged to be complete, but one sample was excluded from the analysis because of laboratory error. The range of sodium excretion for the 39 CBPT subjects was 9 - 181 mmol/24 hour, and the range of 24-hour K:Na was 0.18 - 9.25. The difference between the SIC of the two groups was significant at $p < 0.001$ (t-test), indicating that the checklist discriminates well between these two groups.

The criterion related validity of the SIC was tested through its correlation with the Na and K:Na in the previous 24 hour. urine collection. Table 4.1 gives the Pearson's

correlation of the SIC and the second-morning potassium:sodium ratio with the 24-hour potassium:sodium ratio and the 24-hour sodium excretion.

Table 4-1: Correlation between SIC and morning urine specimen and previous 24 hrs. Na and K:Na excretion

	24 hour. potassium:sodium ratio	24hour. sodium excretion ratio
Sodium intake check-list	0.56 ($p<0.001$)	0.70 ($p < 0.001$)
Second morning potassium: sodium ratio	0.689 ($p<0.001$)	0.555 ($p < 0.001$)

The correlations obtained by the SIC with the two 24 hour. measures indicate an acceptable validity. In addition, considering these results with those discussed above involving spot and overnight urine analysis, the SIC would appear to be at least as good a measure as that obtained from a single specimen of urine. This is corroborated by the results of research carried out not for this present thesis, but employing the SIC. This research is reported elsewhere (Chapman, Fahey, Clift & Millar, 1990). However, the following results were obtained in addition to those presented in that report.

Subjects for this research consisted of three groups. Firstly a control group of 46 chosen at random from the Sydney telephone directory. Secondly a group from Sydney of 160 respondents to a television health promotion campaign, and third, a group of 87 similar respondents living in Canberra. The television campaign was part of a series promoting healthy behaviours and the responses were made to an offer of information regarding the avoidance of dietary sodium.

Urine containers and SICs were posted to subjects who agreed to participate. These subjects then provided a first morning specimen of urine and completed the SIC, posting them back to Westmead Hospital in the Sydney metropolitan area, where both measures were analysed to produce the following results.

Table 4-2: Initial sodium intake estimates from two groups of respondents to a television appeal and a control group

	K:Na Raw Score	*Z Score*	Significance of Difference Between Means	SIC Raw Scores	*Z Score*
Control	**3.35**	***0.459***	(no sig. diff)	**31.06**	***0.489***
Significance of Difference Between Groups	(p = .01)			(p = .006)	
Sydney	**2.74**	***0.1***	(no sig. diff.)	**25.66**	***0.022***
Significance of Difference Between Groups	(p = .019)			(p = .009)	
Canberra	**2.23**	***- 0.216***	(no sig. diff.)	**21.94**	***- 0.299***

These results indicate that the urinary analysis and the SIC had non significant differences in standardised scores within the three groups, and additionally differentiated between groups to the same degree. There is no evidence from these findings to indicate a difference in groupings obtained through either measure. The decision of which measure to employ should therefore be made on the basis of other considerations such as cost or ease of collection.

4.2.5. The Use of the SIC Within the Present Study

In spite of the advantages of questionnaires in estimating dietary sodium, they have been neglected because they have been regarded as unreliable. However the results reported above indicate that the SIC is a reliable and acceptably accurate measure of intake of dietary sodium. Discriminant validity is indicated by the significant difference in scores that were obtained by the groups. The moderate but significant correlations of the SIC scores with the 24-hour. K:Na and the 24-hour. sodium excretion indicate acceptable criterion related validity for the check-list.

The daily sodium intake in each individual is known to vary within extremely wide limits in the average western diet (Liu, Cooper, Soltero & Stamler, 1979), and this would confound seriously any measurement of test-retest reliability. However the Cronbach alpha indicates an acceptable internal reliability of the check-list.

As with any measure of sodium intake, and any measure of behaviour, the SIC may be misleading if it is used only once. The check-list therefore is employed at three day intervals across a two week period, giving five points of measurement. The mean of the SIC scores obtained across two weeks is the dependent variable for the second wave of the CBPT, and for both data collections taken from participants in the low sodium clinic. The measure of sodium intake employed at Time One of Study One was only one recording of the SIC. At the time of this data collection, the SIC had not been validated, and was used in addition to the urinary analysis of sodium and potassium. As explained above, it was not possible to continue with this latter form of analysis. As the urinary analysis also consisted of a single cross sectional measure, and given that there is no evidence to suggest it as a better measure of sodium intake than the SIC, the single SIC score was employed as the behavioural measure in this initial data collection. It may be, therefore, that the measurement of sodium intake at this point is less representative of the subjects' general dietary sodium intake than that obtained in the other three collections.

Chapter 5
RESULTS OF STUDY ONE

The source of subjects and method of data collection for Study One are described in Chapter Three. To reiterate briefly, subjects for this study had taken part in an investigation of the feasibility of adhering to a low sodium diet (The Canberra Blood Pressure Trial). After subjects had completed four months' training and monitoring of avoidance of dietary sodium they were requested to complete the questionnaires which form the data for Time One of this present study (Study One). The subjects were recalled between six to eight months after this Time One data collection and completed a similar set of questionnaires in addition to providing two weeks' data on dietary sodium intake. The results from this second data collection constitute 'Time Two' of the present study (Study One). The following three sections summarise the data presented from Time One, Time Two and the results from the data of both studies combined.

Figure 5-1: Data available for cross-sectional and longitudinal analysis

1. Time One:	- the relationship between Theory of Reasoned Action variables and the measure of social support.
2. Time Two:	- the relationship between Theory of Reasoned Action variables
3. Time One x Time Two:	- the relationship between Time One independent variables (both Theory of Reasoned Action and social support) and Time Two dependent variables.

After a description of the subjects the above three levels of analysis are employed to describe the relationships between the various components of the Theory of Reasoned Action, and also the significance of the additional measure of social support within this model.

5.1. Section One: Description of the Subjects and Data

There were ninety-two subjects who completed data collection at Time One. Of these sixty five returned for the collection of follow up data with fifty two completing records of the SIC over two weeks. The following table compares demographic and clinical descriptors of those subjects who returned for follow up with those who did not.

Table 5-1: Clinical and Demographic description of the Subjects

		First Data Collection only (n = 27)	Second Data Collection (n = 65)
Age (in years)	Mean	48.92	45.3
	SD	12.3	10.6
	Median	49.5	45
	Spread	26 - 66	24 - 7
		Per Cent	Per Cent
Sex	Male	37.0	50.8
	Female	59.3	47.7
Marital Status	Single	7.7	14.1
	Married	73.1	78.1
	Remarried	3.8	1.6
	Defacto	3.6	1.6
	Widowed	11.5	4.7
Referral Source	Doctor	19.2	12.3
	Nurse	0.0	1.5
	Dietitian	0.0	1.5
	Friend	23.1	12.3
	Self	23.1	36.9
	Work Screening	0.0	1.5
	Blood Bank	3.8	9.2
	Other	30.8	12.3

There appears little reason to suggest that the group completing Time Two data collection vary greatly on these parameters from those who dropped out. Chi-square tests of sex, marital status and referral source, and a t test of age indicated no statistically significant difference between the two groups on these parameters.

5.1.1. Data Screening and Description

The following abbreviations have been employed to denote the variables employed throughout this study:

	Time One	Time Two
Behavioural Intention	Bi1	Bi2
Affective Attitude Measure	Aft1	Aft2
Cognitive Attitude Measure (expectancy/value)	Cog1	Cog2
General Subjective Norm (single item)	Gen1	Gen2
Specific Subjective Norm (summed items)	Spc1	Spc2
Sodium Intake Checklist	SIC1	SIC2
Inventory of Socially Supportive Behaviour	ISSB	

5.1.2. Relationship of Model Variables to Behavioural Intention

One case (Bi = 10) was nearly four standard deviations away from the mean which suggests that this individual was not intending to maintain a low sodium diet. As it was intended that subjects at Time One should consist of people who had changed to a low sodium diet, this case was removed from further analysis resulting in a reduction in skew and kurtosis (Skewness = 0.76, Kurtosis = 0.51)

Table 5-2: Examination of the distribution of scores for Bi1 produced the following results (n=92)

Mean = 18.67	SD = 2.34	Kurtosis = .902
Skewness = - 1.061	Range 10 - 21	

Two further cases were excluded from Time One on the basis of a negative expectancy value attitude score. This choice is justified in a similar manner to the case excluded through the examination of behavioural intention which was that the initial group should consist of people who had chosen to adopt a low sodium diet. Holding a negative attitude towards carrying out the necessary behaviours and being the only two of 92 respondents who did so would suggest that these individuals were considerably different from the group to be examined.

Table 5-3: Examination of the distribution of scores for Bi Time Two. (n = 65)

Mean = 11.89	SD = 4.43	Kurtosis = -.86
Skew = .008	Range = 3 - 21	

The change in scaling of the Bi from Time One to Time Two produced a greater spread of scores in Time Two items. This is reflected in a more normal distribution of total intention scores than obtained for Time One.

5.1.3. Outliers

As described above three cases were removed on the basis of containing univariate outliers. (Behavioural intention = 10 and negative expectancy value attitude measures) Multivariate outliers were checked for using a function of the SPSSX statistical package which provides the Mahalanobis distance of the 10 worst cases. This distance is described as 'the distance of a case from the centroid of the remaining cases where the centroid is the point created by the mean of all the variables.' (Tabachick & Fidell, 1989, p.68). The distance is calculated as χ^2 with the degrees of freedom equal to the number of independent variables. With the criterion set at $p < .001$ the same case was determined as a multivariate outlier within the model having behavioural intention and also that with the SIC as the dependent variables. This case was removed from further analysis.

5.1.4. Normality

Univariate normality was assessed by determining the skewness and kurtosis of the individual variables. Only the variable Spc1 showed any marked variation from normality, being somewhat negatively skewed (-1.23) and with positive kurtosis (2.19). These deviations from normality were not considered large enough to warrant transformation of the variable particularly as this variable showed no deviation from normality in the Time Two data.

Multivariate normality was investigated for the model with behavioural intention as the dependent variable, and the model with SIC as the dependent variable, for both Time One and Time Two. The distribution of obtained residuals compared to expected residuals was compared for each condition (Time One Bi - Time One SIC; Time two Bi; Time Two SIC). The behavioural intention model showed little deviation from the expected frequencies at either Time One or Time Two.

The SIC model deviated slightly from the expected normal distribution of residuals at Time One but was acceptable at Time Two. Transformations of the SIC were not undertaken for the following two reasons:

1. As explained above the SIC at Time One consisted of only one measure and produced a truncated score. Time Two and Study Two used multiple measures of SIC which produced normal univariate distributions.

2. A logarithmic transformation of SIC at Time Two produced a marked deviation from normality as determined by both the frequency distribution of obtained residuals and the normal probability plots of the obtained residuals.

5.1.5. Linearity

The bivariate scatterplots were examined for each independent variable with both dependent variables (BI and SIC) in Time One and Time Two data. That is: Aft, Cog, Gen, Spc with Bi and SIC, also Bi with SIC, within Time One and Time Two data. These plots indicated that where there were significant bivariate relationships (as indicated by regression coefficients) that these relationships were linear in nature. There were no clear non-linear relationships present.

Additionally, the scatterplot of standardised residuals against predicted scores showed no departure from linearity or evidence for heteroscedasticity.

5.1.6. Conclusions from Data Screening

After a careful analysis of the data there appears no evidence for employing anything other than the raw scores produced by summing the items within variables. These scores then constitute the data entered into the following multiple regression analysis.

5.1.7. The Use of Multiple Regression and the General Format for Presentation of Results

The use of multiple regression allows a number of levels of analysis of the data. At the first level, the degree to which the Theory of Reasoned Action is able to predict the dependent variables of Bi and SIC at both Time One and Time Two is established. This is determined by the size of the multiple regression coefficients.

The second level involves the identification of which variables contribute a significant independent amount to this prediction. That is, when other variables are held constant does a particular independent variable contribute anything to the variance in the dependent variable. This is determined through examination of the bivariate correlation between the variables and, more importantly, the significance of the regression coefficient (B) and the squared semi-partial correlation (Sr^2) (Tabachnick & Fidell, 1989). This latter measure (the Sr^2) represents the unique contribution of that independent variable to the multiple regression coefficient in the total set of independent variables.

Thirdly, it is possible to test for any increase in predictive power achieved by the addition of the ISSB to the TRA. This is indicated by the significance of an increase in the size of the R^2.

Fourthly, irrespective of changes in R^2 it can be determined if the ISSB produce a significant path coefficient (as determined by the significance of beta) within the model.

These four levels of analysis are carried out firstly in assessing the models in relation to behavioural intention using data from Time One, Time Two, and between Time One and Time Two. Secondly, the analysis is repeated to assess the models in relation to the SIC.

Full results are presented for each analysis. These consist of means, standard deviations, and bivariate correlations for each variable. Multiple regression parameters presented are the regression coefficient (B), the standardised regression coefficient (β), the squared semi-partial correlation (Sr^2), the multiple correlation (R), the variance (R^2) and the adjusted variance (adjusted R^2). Significance levels are indicated at $p < .05$ and $p < .01$.

Following the presentation of the full model containing all variables, a reduced model containing only the significant coefficients is discussed. This model is achieved through the elimination of nonsignificant variables, successively one at a time (in ascending order of F value). Each nonsignificant variable was then checked for significance by entering it singularly with the established significant variable. Where such a reduced model was established a further check of the possible effect of the non-significant variables was carried out through determining the effect on R^2 of entering *all* such variables as a block in a heirarchical regression.

5.2. Section Two: Antecedents of Behavioural Intention

5.2.1. Multiple Regression of Time One Variables in Predicting Behavioural Intention

A standard multiple regression was performed entering all the variables for the Theory of Reasoned Action collected at Time One. As discussed in Chapter Two, there is some disagreement in the literature as to which attitude measure (cognitive or affective) and which measure of subjective norm (specific or general) most adequately reflects the overall dimensions of 'attitude' and 'subjective norm'. Some authors have empirically determined the 'best' predictors in these data sets and subsequently employed these variables in testing the addition of further variables to the theory (see Chapter Two Sections 2.2 and 2.4). The intention at this step of the analysis was firstly to determine the adequacy of the original formulation of the Theory of Reasoned Action in predicting behavioural intention, and secondly to select the independent variables with significant regression coefficients.

Table 5-4: Time One standard multiple regression of Theory of Reasoned Action variables on behavioural intention. n = 89

	Bi 1	Aft1	Cog1	Gen1	Spc1	B	β	Sr^2
Aft1	.39**					.13*	.22	.04
Cog1	.47**	.39**				.03**	.36	.11
Gen1	.23*	.24*	.05			.03	.10	.01
Spc1	.10	.18	.07	.53**		.00	.02	.00
Means	18.75	23.46	71.65	8.67	31.09			
SD	2.19	3.59	29.7	9.09	33.04			

R^2 = .28
Adjusted R^2 = .25
R = .53**

* p < .05, ** p < .01

The R for regression was significantly different from zero, (df,4/89 F = 8.21, p = .0001). The two regression coefficients for Aft1 and Cog1 differed significantly from zero. Only these two variables contributed significantly and independently to the prediction of behavioural intention, Aft1 Sr^2 = .04 and Cog1 Sr^2 = .11. The four independent variables in combination contributed another .13 in shared variability. Altogether 28% (25% adjusted) of the variability in behavioural intention was predicted from knowledge of the four independent variables.

Within this data set therefore, cognitive attitude *and* affective attitude were independently significant in the formulation of behavioural intention, contrary to the sequential nature of these variables proposed by the Theory of Reasoned Action. The results also indicate that the subjective norm played no significant part in the formulation of the intention to maintain a low sodium diet.

Having tested the adequacy of the Theory of Reasoned Action in describing this data, a second model was tested, retaining the same variables displayed in Table 5.4.1, but with the addition of the ISSB scores as a fifth independent variable.

The R for regression was significantly different from zero (df,5/84 F = 6.58, p < .001). Once again only Aft1 and Cog1 contributed significantly to R^2 (Aft1 Sr^2 = .04,

Cog1 Sr^2 = .10). The five independent variables contributed another .13 in shared variability with a total of 28% (25% adjusted) of variability in Bi1 being predicted from a knowledge of the five variables.

The addition of the ISSB variable produced no significant change in R^2 nor in the regression coefficients of the original Theory of Reasoned Action variables. The regression co-efficient for ISSB was non-significant. The ISSB correlated significantly with Cog1 ($r = .21$, $p < .05$). No other correlation with $p < .05$ occurred. Social interaction therefore did not contribute directly to the formulation of behavioural intention, but may have had an independent effect through its contribution to the formation of cognitive attitude. This relationship would be as predicted by the the Theory of Reasoned Action.

5.2.2. Multiple Regression of Time Two Variables on Behavioural Intention

At Time Two, only the variables proposed by the Theory of Reasoned Action and the two weeks record of the Sodium Intake Checklist were collected. The following table presents the results of the multiple regression of these independent variables on Time Two BI.

Table 5-5: Time Two Standard multiple regression of Theory of Reasoned Action variables on behavioural intention (Bi2). n = 59

	Bi 2	Aft2	Cog2	Gen2	Spc2	B	β	Sr^2
Aft2	.27*					.34*	.29	.07
Cog2	.35**	.40**				.03	.20	.03
Gen2	-.12	.14	.07			.01	.01	.00
Spc2	-.29*	.12	.18	.61		-.05*	-.34	.07
Mean	11.71	22.75	69.09	6.68	40.54			
SD	4.45	3.38	30.73	6.71	27.61			

$R^2 = .25$
Adjusted $R^2 = .20$
$R = .50$**

* $p < .05$, ** $p < .01$

R for regression was significantly different from zero, (df,4/54 F = 4.58, p = .003). The regression coefficients for Aft2 and Spc2 differed significantly from zero, (Confidence limits of .0345 to .6433 and - .027 to -.0064 respectively). Both these

variables provided a significant independent contribution to the prediction of behavioural intention, (Aft2 Sr^2 = .07 Spc2 Sr^2 = .07). The four independent variables in combination contributed a further .08 in shared variability. Altogether 25% (20% adjusted) of the variability in Bi2 was predicted from knowledge of the four variables.

The results of the cross-sectional analysis of this long term maintenance data are quite consistent with the Theory of Reasoned Action with the exception of the specific rather than general measure of subjective norm proving significant. Of interest is the inverse nature of the relationship between intentions and subjective norm. This suggests that the lower the subjective norm the greater the intention to adhere to a low sodium diet. The subjective norm is comprised of the degree of agreement the significant other expresses for the behaviour multiplied by the individuals motivation to comply with this significant other. A low score therefore occurs either through a low level of agreement or zero to negative motivation to comply.

It would appear that either the less perceived agreement or the more independent or rejecting the respondent was of these significant others' opinion, the greater the degree to which he or she intended to adhere to the low sodium diet.

5.2.3. Multiple Regression of Time One Variables on Time Two Behavioural Intention

The previous two Sections have determined the relationship between the Theory of Reasoned Action variables and intention at short and long term maintenance. Additionally, the degree of general social support experienced during the short term maintenance stage did not affect the formation of intention at this point.

This Section examines the relationship from short to long term maintenance. Firstly, testing the significance of all Time One independent variables in determining Time Two intention; and secondly, testing the contention of the Theory of Reasoned Action that all variables extraneous to the model (in this case the Time One social interaction), and measured prior to the measurement of the Theory of Reasoned Action variables (in this case the significant Time Two independent variables), will not independently contribute to behavioural intention.

The first of these analyses produced no significant results. No significant bivariate correlations were observed between any Time One variable and Time Two behavioural intention, neither was a significant R obtained in a multiple regression of all Time One independent variables (including social support) onto Time Two intention. It would appear from these data that neither the respondents' attitudes, subjective norms nor the degree of general social support experienced during early maintenance had a direct effect on the formation of behavioural intention during the latter maintenance stage.

The second analysis supported the original formulation of the Theory of Reasoned Action in that the addition of Time One social support to the significant Time Two antecedents of Time Two behavioural intention produced no significant change in R^2 nor did the social support measure achieve a significant beta weight.

The results obtained through the analysis of the antecedents of behavioural intention in all Study One data strongly suggest that there is no direct relationship between the degree of general social support at the early maintenance stage and the formation of behavioural intention either during early or late maintenance.

Having determined the significant antecedents of behavioural intention within early and late maintenance and from early to late maintenance, the same series of analysis were next performed to determine the significant antecedents of the actual reported level of sodium intake. The results of these analyses appear in the following Section.

5.3. Section Three: Antecedents of Sodium Intake

5.3.1. Multiple Regression of Time One Variables on SIC1

All Time One variables proposed by the Theory of Reasoned Action were entered into a standard multiple regression onto the measure of actual behaviour (SIC1). The results are presented in the following table.

Table 5-6: Standard multiple regression of Time One Theory of Reasoned Action variables on SIC1. N = 88

	SIC1	Bi 1	Aft1	Cog1	Gen1	Spc1	B	B	Sr^2
Bi 1	-.42**						-.81**	-.34	.08
Aft1	-.24*	.39**					-.07	-.05	.00
Cog1	-.28**	.47**	.38**				-.02	-.10	.01
Gen1	-.15	.25*	.23*	.14			-.01	-.02	.00
Spc1	-.14	.16	.16	.11	.61		-.01	-.05	.00
Mean	5.40	18.75	23.41	71.38	8.53	32.08			
SD	5.33	2.20	3.58	29.76	9.00	32.35			

$R^2 = .19$
Adjusted $R^2 = .14$
$R = .43$**

* $p < .05$; ** $p < .01$

The multiple correlation coefficient for this regression was significant (at p = .004, df 5/82, F = 3.83). Behavioural intention was the only independent variable which achieved a significant regression coefficient (confidence interval -1.385 to -.251), independently accounting for 8% of the variation in sodium intake. The five IVs combined accounted for a further 11% in shared variability. These data therefore support the original Theory of Reasoned Action with attitude and subjective norm affecting behaviour only through their effect on behavioural intention.

To test for any effect of social support on the level of sodium intake, the ISSB was entered with the above Theory of Reasoned Action variables in a multiple regression onto SIC1. The results appear below. As the social support measure relates to the four week period leading up to the measure of the Theory of Reasoned Action variables the theory would predict that the addition of this variable would have no effect on the size of R^2 nor would it achieve a significant beta weight.

Table 5-7: Standard multiple regression at Time One Theory of Reasoned Action variables with Social Support on SIC1. n = 88

	SIC1	Bi 1	Aft1	Cog1	Gen1	Spc1	ISSB	B	β	Sr^2
Bi 1	-.42**							-.87**	-.36	.09
Aft1	-.24*	.39**						-.07	-.04	.00
Cog1	-.28**	.47**	.38**					-.03	-.14	.01
Gen1	-.15	.23*	.23*	.14				-.03	-.05	.00
Spc1	-.14	.16	.23*	.11	.61			-.01	-.06	.00
ISSB	.17	.17	.16	.21*	.17	.13		.07**	.28	.07

ISSB mean: 74.90 SD: 20.6

R^2 = .26
Adjusted R^2 = .21
R = .51**

* p < .05; ** p < .01

The change in R^2 produced by the addition of ISSB to the earlier model was significant (df,1/81 F = 7.82, p = .006). The R for regression was significant at p < .01 (df,6/81 F = 4.76). Behavioural Intention and Social Support both had regression weights significantly greater than zero (confidence intervals of -1.412 to -.3195 for Bi and 0.021 to .123 for ISSB). These two variables contributed a significant independent amount to R^2 (BI, Sr^2 = .09; ISSB, Sr^2 = .07). Altogether the six variables contributed a further 6% in shared variance, with a total of 26% (21% adjusted) of the variance of SIC1 being gained from a knowledge of the six independent variables.

ISSB has a beta weight significantly greater than the bivariate correlation with SIC1. Tabachnick & Fidell (1988) suggest that this may be indicative of the existence of a suppressor variable. To test for the existence of such a suppressor variable, each independent variable was removed from the equation in succession. This produced no marked change in the β for ISSB suggesting that no one variable was more responsible than another for the suppression of irrelevant variance in ISSB.

The sign of the beta weight for ISSB is positive whereas all other variables are negative. As a high SIC1 score indicates high sodium intake, this positive relationship indicates that the greater the degree of general social support, the less the individual has adopted the low sodium diet.

These data therefore support the proposal that social support directly affects the health-related behaviour of sodium intake independent of the effect of the intra-psychic variable proposed by the Theory of Reasoned Action. The clinical significance of the negative relationship between the degree of general social support and maintenance of a low sodium diet is discussed in Chapter 8.

5.3.2. Multiple Regression of Time Two Theory of Reasoned Action Variables on SIC2

All Time Two variables proposed by the Theory of Reasoned Action were entered into a multiple regression on SIC2. The results appear in the following table:

Table 5-8: Standard multiple regression of Time Two Theory of Reasoned Action variables on SIC2. n = 51

	SIC2	Bi 2	Aft2	Cog2	Gen2	Spc2	B	β	Sr^2
Bi 2	-.73**						-1.06**	-.63	.23
Aft2	-.41**	.56**					.03	.01	.00
Cog2	-.52**	.34**	.32*				-.08**	-.32	.14
Gen2	.15	- .17	.24*	.06			.17	.16	.06
Spc2	.15	- .06	.12	.01	.59		-.07	-.06	.01
Mean	9.45	12.31	22.65	69.82	6.10	38.94			
SD	7.67	4.54	3.87	31.40	7.29	29.49			

$R^2 = .63$
Adjusted $R^2 = .59$
$R = .80$**

* $p < .05$; ** $p < .01$

R for regression was significantly different from zero, (df 5/45, F = 15.51 p = .0000). Significant regression coefficients were obtained for behavioural intention (Bi 2) and the expectancy value measure of attitude (cog2) (confidence interval for Bi 2 -7.31 to -3.4536, and for Cog2 -.5629 to -.0985). Each of these variables contributed a significant independent amount to R^2 (Bi2, Sr^2 = .23; Cog2, Sr^2 = .14). Together the five independent variables accounted for 27% in shared variance, with a total of 63% (59% adjusted) of the variance in SIC2 being gained from a knowledge of the five variables.

These results strongly support behavioural intention as the major predictor of behaviour within these data. This finding is in agreement with the Theory of Reasoned Action. However, the independent contribution of cognitive attitude to behaviour does not support the sequential nature of the variable proposed within the theory.

5.3.3. Time One Variables as Predictors of Time Two Sodium Intake

The R for regression of all Time One Theory of Reasoned Action variables was not significant (R = .44, df 5/41, F = 1.98, p = .10). None of the independent variables produced regression coefficients significantly different from zero. The two variables of Time One behavioural intention and expectancy value attitude measure correlated significantly with sodium intake at Time Two.

Table 5-9: Significant bivariate correlations of Time One variables to Time Two SIC

	Bi1	Cog1
SIC2	-.26 (p=.04)	-.29 (p=.02)

The social support measure did not correlate significantly with SIC2, nor was a significant R achieved when this variable was entered with BI1 in a multiple regression on SIC2. It would appear therefore, that within this sample, neither the attitude, subjective norm, social support nor the behavioural intention held by respondents during the early maintenance stage, had a direct effect on the performance of behaviour at the late maintenance stage.

To test further the sequential nature of variables proposed by the Theory of Reasoned Action the social support measure from Time One was combined with the significant Time Two predictors of sodium intake. This Time One social support measure produced no change in the R^2, nor was its beta weight significantly different from zero. The addition of this variable produced no appreciable change in the beta for the other independent variable. This result supports the Theory of Reasoned Action contention that variables extraneous to the model and measured at some point prior to the measurement of model variables will affect behaviour only through their affect on these model variables.

5.4. Discussion of Study One Results

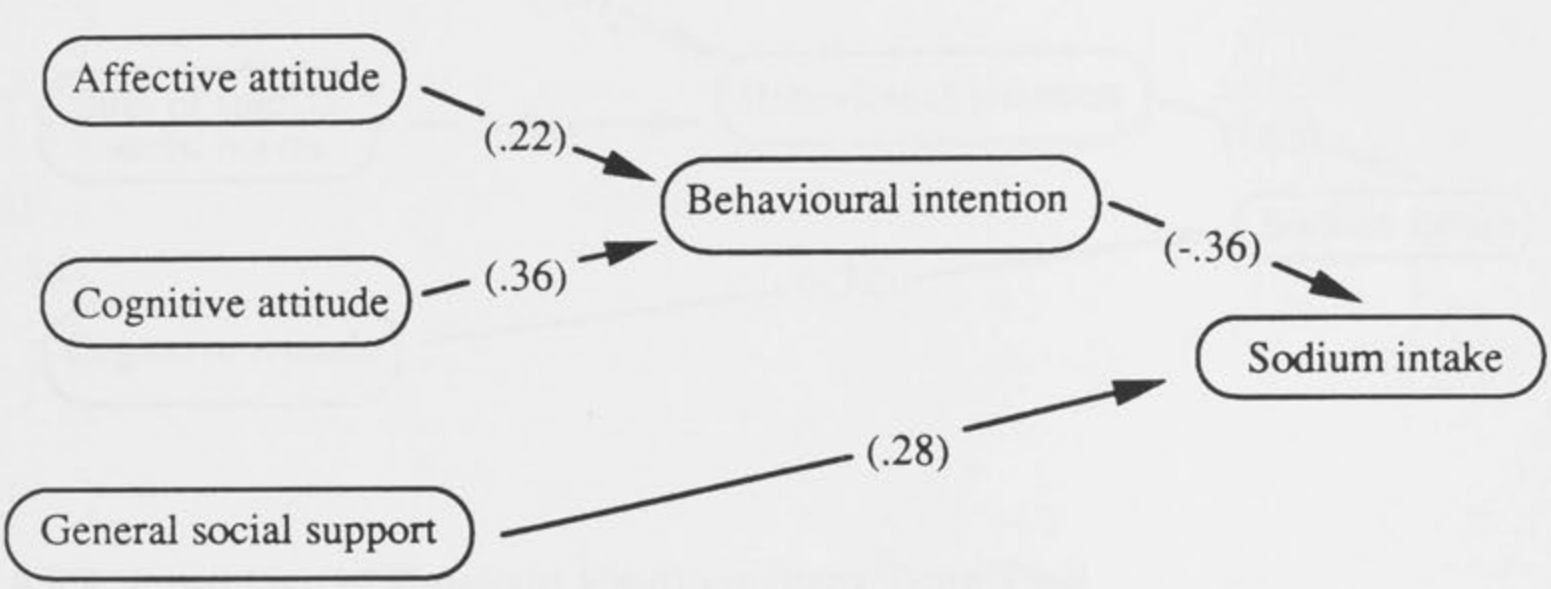
5.4.1. Time One

Time One prediction of behavioural intention differs slightly form the original Theory of Reasoned Action in that both the Affective *and* the cognitive measures contribute uniquely to the formation of behavioural intention. There is no significant effect of social support on the formation of behavioural intention in this data set.

The analysis of Theory of Reasoned Action variables alone agrees with the original formation of the theory in that behavioural intention is the only variable which contributes independently to the prediction of sodium intake. However, as proposed in this thesis, the measure of general social support provides a significant independent contribution to prediction of sodium intake, over that of behavioural intention alone.

These relationships are presented in the diagram below where the numbers in brackets are the beta weights for the independent variable on the left obtained from the multiple regression onto the dependent variable on the right.

Figure 5-2: Overall results derived from Time One data



The discussion of these results will not be developed at this point. Further discussion will be held until after the presentation of results obtained in Study Two.

5.4.2. Summary of Relevant Findings from Time One

1. COGNITIVE AND AFFECTIVE ATTITUDES BOTH CONTRIBUTE TO BEHAVIOURAL INTENTION.
2. SOCIAL SUPPORT DOES NOT INDEPENDENTLY CONTRIBUTE TO BEHAVIOURAL INTENTION.
3. SOCIAL SUPPORT DOES CONTRIBUTE INDEPENDENTLY TO SODIUM INTAKE, AND
4. THE HIGHER THE LEVEL OF SOCIAL SUPPORT THE LOWER THE ADHERENCE TO A LOW SODIUM DIET (I.E. THE HIGHER THE SODIUM INTAKE).

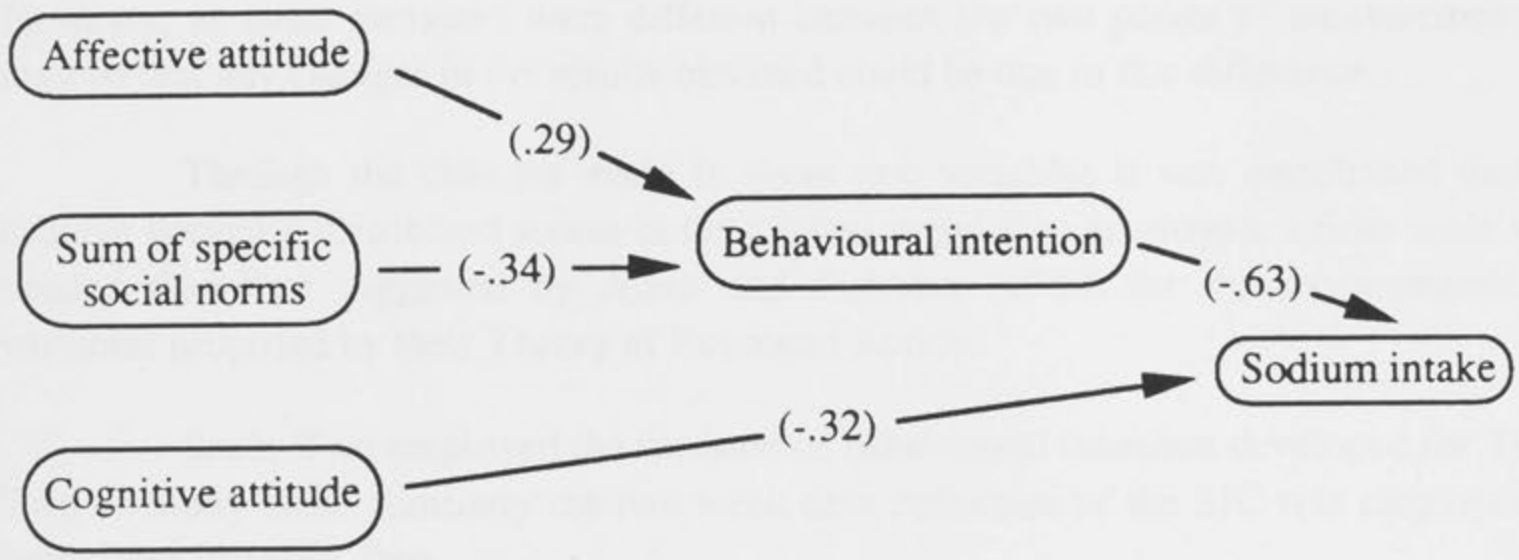
5.4.3. Time Two

The results obtained from Time Two provide qualified support for the Theory of Reasoned Action in prediction of behavioural intention. As with Time One, the affective attitude measure contributes significantly to the prediction of behavioural intention. However, unlike Time One the cognitive attitude measure is not significant while the measure obtained by adding the product of significant others' opinion x motivation to comply - the specific subjective norm - does provide a significant contribution to behavioural intention.

A significant departure from the theory of reasoned action occurred in the prediction of sodium intake. While behavioural intention is by far the most important antecedent of sodium intake in this data, the outcome expectancy x evaluation measurement - the cognitive attitude - adds a significant unique 14% of the variance.

The overall results with beta weights are presented in the following diagram.

Figure 5-3: Overall results derived from Time Two data



5.4.4. Summary of Relevant Findings from Time Two

1. THE THEORY OF REASONED ACTION IS GENERALLY SUPPORTED IN TERMS OF THE PREDICTION OF BEHAVIOURAL INTENTION, WITH THE EXCEPTION THAT THE SPECIFIC RATHER THAN THE GENERAL MEASURE OF SOCIAL NORM IS SIGNIFICANT.
2. BOTH BEHAVIOURAL INTENTION AND COGNITIVE ATTITUDE CONTRIBUTE INDEPENDENTLY TO THE DEGREE OF SODIUM INTAKE.

5.4.5. Prediction of Time Two Behavioural Intention and Sodium Intake from Time One Measures

The results of this analysis do not support the thesis that the level of general social support at Time One is significant in determining the degree of adherence to a low sodium diet at Time Two. Neither, apparently, is this general social support significant in the prediction of the significant Time Two behavioural intention.

There were no Time One variables which added to prediction of Time Two sodium intake above that achieved through a knowledge of significant Time Two variables. It would appear, therefore, that these Time One variables affect the maintenance of a low sodium diet only in as much as they affect these significant Time Two variables.

5.4.5.1. Summary of relevant findings from the longitudinal study

1. GENERAL SOCIAL SUPPORT DOES NOT SIGNIFICANTLY INFLUENCE SODIUM INTAKE AT TIME TWO NOR THE IMMEDIATE SIGNIFICANT ANTECEDENTS OF SODIUM INTAKE AT TIME TWO.
2. THE EFFECT OF ANY TIME ONE VARIABLE ON TIME TWO SODIUM INTAKE IS ONLY INDIRECT, BEING MEDIATED THROUGH TIME TWO BEHAVIOURAL INTENTION AND COGNITIVE ATTITUDE.

5.5. Methodological Problems

The changes in measurement of behavioural intention and sodium intake from Time One to Time Two achieved a more normal distribution in these two variables. However, as these measures were different between the two points of measurement, it may be that any changes in the results obtained could be due to this difference.

Through the changes made in these two variables it was established that to achieve normally distributed scores in the clinical population employed, a finer scale was needed than that suggested by Ajzen and Fishbein (1980) for the measurement of variables proposed by their Theory of Reasoned Action.

Study Two employed the measure of behavioural intention developed for Time Two of Study One. Similarly the two week data collection of the SIC was employed at both times in Study Two.

Study One measures of cognitive and affective attitude consisted simply of those beliefs or significant others identified by Canberra Blood Pressure Trial participants as most influential in maintaining a low sodium diet. While arriving at these items through this method (described in Chapter 4) ensures adequate 'face' validity no attempt to determine internal reliability was made, with each item presented included in the final scale. The following Chapter describes how item-total correlations were employed to select items for inclusion in these scales for Study Two.

The affective attitude measure employed in both data collections of Study One consisted of four semantic differential scales attached to one general question regarding sodium intake. A possible shortcoming with this measure lies in its lack of exact correspondence to the behavioural intentions measure. This latter consists of statements relating generally to avoiding dietary sodium, avoiding sodium added to cooking or at the table and avoiding sodium added in the manufacturing process. The construction of more appropriate scales is described in Chapter Six.

The refinements of the measures was made firstly to adhere more closely to the constructs proposed by the Theory of Reasoned Action and secondly to improve the shape of the distributions obtained to enable greater confidence to be placed in generalisations outside the present sample.

5.5.1. Social Support Measures

The measure of social support employed in Study One consisted of a general measure of socially supportive behaviours, the Inventory of Socially Supportive Behaviours. While most research employs such general measures, the clinical literature and some theorists suggest the need to specify the type of support further when dealing with its effect on specific health-related behaviours. The following section reviews this literature within three sections. Firstly, the need to identify the social interactions *specifically* related to the behaviour in question. Secondly, the need to look at not only social interactions which are *supportive* but also those which may *sabotage* the performance of the behaviour. Thirdly, involving the respondent in determining the significance of the interaction for him or her, that is the respondent's *evaluation* of the interaction.

5.5.1.1. Identifying specific social interactions

There is generally a difference between that which is termed 'social support' when reported in theoretical research and when reported as part of a treatment program. The former usually consist of a measure of some aspect of general social interaction for example - network size, perceived availability of (general) support or, the frequency of a wide range of supportive behaviours (Asher, 1984; Langlie, 1977; Umberson, 1987). Clinical studies on the other hand tend to focus on socially supportive behaviours which are specifically related to the performance of the target behaviour by the subject (Baranowski, Nader, Dunn & Vanderpool, 1982; King & Frederiksen, 1984; Zimmerman & Connor, 1989). More recent research in the area of health-related behaviour change has incorporated measures of both general and specific social interactions (Mermelstein, Cohen, Lichtenstein, Baer & Kamarck 1986; Cohen, Lichtenstein, Mermelstein, Kingsolver, Baer & Kamarch, 1988; Aaronson, 1989). In a review of research in social support and patient compliance with medical regimes Levy (1985) concludes that there is increasing attention being paid to the specific aspects of social support which would be expected to relate to compliance, and recommends that 'Researchers should ask what are the specific behaviours which "significant others" use to support compliance.' (Levy, 1985, p.98)

Following this recommendation, and in line with current trends in research, Study Two incorporated a measure of significant others' behaviour related specifically to the respondent's maintenance of a low sodium diet. This measure, developed specifically for this research, was termed the Sodium-related Social Interaction Scale (SSIS).

5.5.1.2. Social support and social sabotage

A further general shift in the literature relating the respondent's social environment to his or her health behaviours, has been an acknowledgement of the need to include negative aspects of this environment. While not necessarily implying intent on the part of the 'significant other' (no more or less than does the word 'support'), the negative behaviours exhibited by others are termed social sabotage throughout this thesis.

A number of studies have found a significant relationship between various measures of psychological well being and negative aspects of the social environment. Several different measures and different terms have been employed. For example, Brenner Norvell and Limacher (1989) investigated life satisfaction in a group of medical students. They found that the total number of supportive interactions *and* the total number of problematic interactions were equally predictive of life satisfaction. They also found a measure of sources of *consistent* problematic interaction to be significant. Finch, Okum, Barrera, Zautra and Reich (1989) point out that social support research has focussed almost exclusively on positive interactions. Their research found that while positive social ties were related to psychological well-being, negative social ties were related to psychological well-being and distress. A similar finding is reported by Rook (1984) who reported a stronger relationship between negative social interaction and well-being than that with positive social interactions.

The effect of social sabotage on health behaviour change and maintenance has been discussed in only a few studies. Cohen, et al. (1988) reported that the existence of smokers in a quitter's social network was negatively related to both cessation and long term maintenance. They found this in contrast to specific partner support and the perceived availability of general support both of which related to initial cessation and short term maintenance only. Relapse to excessive alcohol consumption has been found by Marlatt and Gordon (1980) as most frequently associated with stressful interpersonal emotional states, interpersonal conflict, and situations involving social pressure to drink.

This research implicating social sabotage as potentially reducing the maintenance of a health-related behaviour change led to the decision to investigate both social support and social sabotage through the use of the SSIS in Study Two.

5.5.1.3. Respondent evaluation of the specific social interaction

Several reports of ostensibly supportive social interactions have indicated that these interactions may not always be perceived as supportive by the recipient. The perceived helpfulness of a specific social interaction has been shown to vary dependent on the source. For example Dakof and Taylor (1990) found that cancer patients reported particular social interactions to be helpful when coming from some members in their social network but not from others. Similar results were obtained by Neuling and Winefield (1988).

In discussing the overall process of supportive social relations to work stress, House (1981) strongly argues that the supportiveness or otherwise of a behaviour is largely dependent on the perception of that behaviour by the recipient.

To allow for recipient perception differing across individuals, the SSIS employs a product of frequency by evaluation for each item. To allow further for differences in evaluation between different sources of the interaction, each item consists of the sum of frequency by evaluation across four potential sources: spouse, family, friends, and work or daily activity.

A complete description of all the variables employed in Study Two, including the SSIS, is provided in the following Chapter. The discussion of Study One results is continued in Chapter 8, after this description of the variables employed and the results obtained in Study Two.

Chapter 6

THE DEVELOPMENT OF VARIABLES AND PROCEDURE FOR STUDY TWO

The measures employed in Study One were developed according to instructions given by Ajzen and Fishbein (1980). This involves the selection of items based on their significance as reported by an appropriate sample of the population in question. Changes made in the measurement of behavioural intention and the extended use of the SIC between Time One and Time Two of Study One at least produced measures with more normal distribution. These changes may also have been responsible for the apparent increase in the relationship between these variables from Time One to Time Two. Given these results, Study Two employed expanded and refined measures for all variables proposed by the the Theory of Reasoned Action. This chapter describes the development of these variables. Additionally a measure focussing on social interactions specifically related to sodium intake was developed. The Theory of Reasoned Action emphasises the need to match the proposed variables with each other as closely as possible, and the need to target a specific behaviour rather than a behavioural domain. The Sodium-related Social Interaction Scale (SSIS) was developed in line with this argument. That is, it was considered possible that the weak association between social support and the other variables measured in Study One may have been due to the general nature of the Social Support measure. The development of the SSIS is described later in this chapter.

6.1. Development of Theory of Reasoned Action Variables

6.1.1. Behavioural Intention

The scale employed in Time Two of Study One was also employed for this study. The three statements and the scale employed in Time Two of Study One were employed for Study Two. These statements related to avoiding eating food containing sodium. For Study Two, a further statement was added asking respondents how frequently over the next six months they would eat low sodium food.

The final score for this variable consisted of the mean of the total number of responses. Scores were accepted if responses were given to at least two statements. All four statements were responded to by 97% of the subjects. The four item scale achieved a Cronbach alpha of .82.

6.1.2. Semantic Differential Attitude Measure

To determine the semantic differentials relevant to an affective attitude towards maintaining a low sodium diet, forty low sodium clinic (LSC) participants were asked to select five sets from a list of nineteen alternative adjectives. Subjects were asked to select the dimensions which they considered most important in their maintaining a low sodium diet. If an item was selected by at least ten respondents it was included in the scale. The items thus selected were:

1. foolish-sensible
2. unappetizing-appetizing
3. easy-hard
4. unhealthy-healthy
5. pleasant-unpleasant
6. unbeneficial-beneficial
7. convenient-inconvenient
8. good-bad
9. desirable-undesirable
10. possible-impossible
11. unsociable-sociable

Subjects in Time One of Study Two were asked to rate four statements matching the four behavioural intention measures. Each statement was rated on the above eleven semantic differential pairs using a seven point scale for each pair. The SPSSX statistical package was employed to determine the item-total correlation for each of the 44 items. A conservative cut off of .4 was chosen for inclusion of an item in the final scale. This resulted in selection of the following semantic differential.

1. Eating low sodium food - adjective pair, 2,3,5,7 and 11.
2. Avoiding eating salted food - 2,3,5,6,7,8 and 11.
3. Avoiding eating discretionary sodium - 2,3,5,7,8 and 11.
4. Avoiding eating manufactured food with sodium added - 2,3,5,7 and 11.

The resulting scale achieved an alpha of 0.84. The semantic differentials excluded in at least three of the four statements were:

Foolish - sensible
Healthy - unhealthy
Unbeneficial - beneficial
Desirable - undesirable
Possible - impossible

The final scale therefore excludes all reference to health-related consequences, focussing primarily on the immediate consequences or ease of performing the behaviour.

6.1.3. Expectancy Value Attitude Measure

Study One generated expectancy/value items from clinic participants. However, only those reported by at least a quarter of the respondents were included in the final scale. The derivation of the scale score for Study Two differs from this in that the initial pool of items relating to eating low sodium food consisted of *all* those identified in the Canberra Blood Pressure Trial Participants in Study One. Items with an item-total correlation less than .3 were removed to increase the internal reliability of the scale. This resulted in the following 10 item scale with an alpha of 0.80.

Eating low sodium food:

1. means going without my favourite foods.
2. results in better health.
3. will reduce high blood pressure.
4. improves one's awareness and interest in food.
5. results in an increased appreciation of the flavour of foods.
6. means taking more time in food preparation.
7. means eating healthier foods.
8. results in an increased sense of well being.
9. reduces the risk of heart attack, stroke or other medical problems.
10. will prevent high blood pressure.

This scale includes all but one of the originally presented items which questioned beliefs regarding the health consequence of carrying out the behaviour.

6.1.4. Subjective Norm Measure

Both subjective norm measures (specific and general) were those developed in Study One. One of the eight 'specific' items - people who usually disagree with one - was removed from the scale on the basis of an item-total correlation less than .3. The Cronbach Alpha for the resulting seven item scale was .68.

6.2. Social Support General Measure

The ISSB was employed as in Study One. All 40 items were included and achieved an alpha of .92. The score for the ISSB was obtained from a summation of the responses across the 40 items.

6.3. Development of the Sodium-related Social Interaction Scale (SSIS)

As discussed in Chapter 5, the SSIS was developed to investigate further the finding of Study One that general social support did not relate to the maintenance of a low sodium diet. The SSIS is intended to measure the following aspects of social interactions:

1. THOSE SOCIAL INTERACTIONS SPECIFICALLY RELEVANT TO THE RESPONDENT'S DIETARY SODIUM INTAKE.
2. WITHIN THIS SPECIFIC RANGE OF SOCIAL INTERACTIONS, FURTHER IDENTIFYING THE BEHAVIOURS OF SIGNIFICANT OTHERS WHICH SUPPORT THE MAINTENANCE OF A LOW SODIUM DIET AND THOSE WHICH SABOTAGE THE MAINTENANCE OF THIS BEHAVIOUR.
3. THE PARTICULAR SIGNIFICANCE OF ONE INTERACTION TO THE INDIVIDUAL RESPONDENT. THIS IS DONE BY ALLOWING THE RESPONDENT TO EVALUATE HOW SUPPORTIVE OR SABOTAGING A PARTICULAR BEHAVIOUR MAY BE FOR THEM PERSONALLY.
4. ALLOWING FOR DIFFERENCES IN THIS EVALUATION DEPENDENT ON THE SOURCE OF THE BEHAVIOUR WITHIN THE RESPONDENT'S SOCIAL NETWORK.

6.3.1. Selection of Initial Item Pool

Twenty-six social interactions relating to sodium intake were selected by the staff from the Low Sodium Clinic. Consideration was given to the nature of the interaction in making this selection, in that staff selected items falling under the three headings of emotional direction, guidance and tangible social interaction.

The twenty-six items were presented as both supportive or sabotaging, forming an initial questionnaire of fifty-two items (see Appendix E). Thus, for example, item one of this questionnaire read 'Indicated they *agreed* with my staying on a low sodium diet' and item thirteen read 'Indicated they *disagreed* with my staying on a low sodium diet'.

This fifty two item questionnaire was given to forty-six participants in the Low Sodium Clinic (not those involved in the main data collection for Study Two). Respondents were asked to evaluate, on a seven point scale from 'extremely helpful' to 'extremely unhelpful', the significance of each of the items for the maintenance of a low sodium diet. Forty items were selected from the initial pool of fifty-two. Selection was made on the basis of at least 40% of respondents scoring one or two (extremely helpful and quite helpful) indicating a positive item, or scoring six or seven (quite unhelpful, extremely unhelpful) indicating a negative item. This resulted in a forty item scale consisting of twenty-two positive activities and eighteen negative activities.

The final questionnaire containing these items can be found in Appendix G. Each item was presented in the following format:

	Spouse	Family	People in a social setting	People at work or daily activity.
Initial	_____	_____	_____	_____
Number of times	_____	_____	_____	_____
Unhelpful to helpful	_____	_____	_____	_____

Respondents were provided with a set of written instructions (Appendix F), and observed while they read the instructions and completed the example item at the beginning of the answer booklet.

The occurrence of an event within the past four weeks was indicated firstly by providing the initial of the individual carrying out that event. This was to help focus attention and to ensure that each response represents a real event as opposed to a general indication of positive or negative interaction. The next response required the subject to indicate the frequency of the occurrence over the past four weeks, giving a five point scale ranging from 'once only' to 'about once a day'. This is similar to the scale employed by the ISSB. Finally the respondent indicated, on a seven point scale how helpful to unhelpful the specific performance of this behaviour had been in maintaining their low sodium diet. The score for each of the forty items was obtained by summing the product of each separate frequency by evaluation indicated for that item.

The support score was obtained by of summing all 22 positive items and the sabotage score by summing all 18 negative items. All available items were included in these two scales for the following reasons.

1. Prior to administration of the questionnaire, all items had been selected as particularly relevant to the maintenance of a low sodium diet by a sample drawn from the same population as the Study Two subjects.
2. The evaluation score for each response on each item ranged from '-3' (unhelpful) through '0' (neutral) to '3' (helpful). Therefore if the respondent did not see the interaction as relevant to the maintenance of their low sodium diet, even though it may have occurred frequently, the score for this response (frequency x evaluation) was zero.

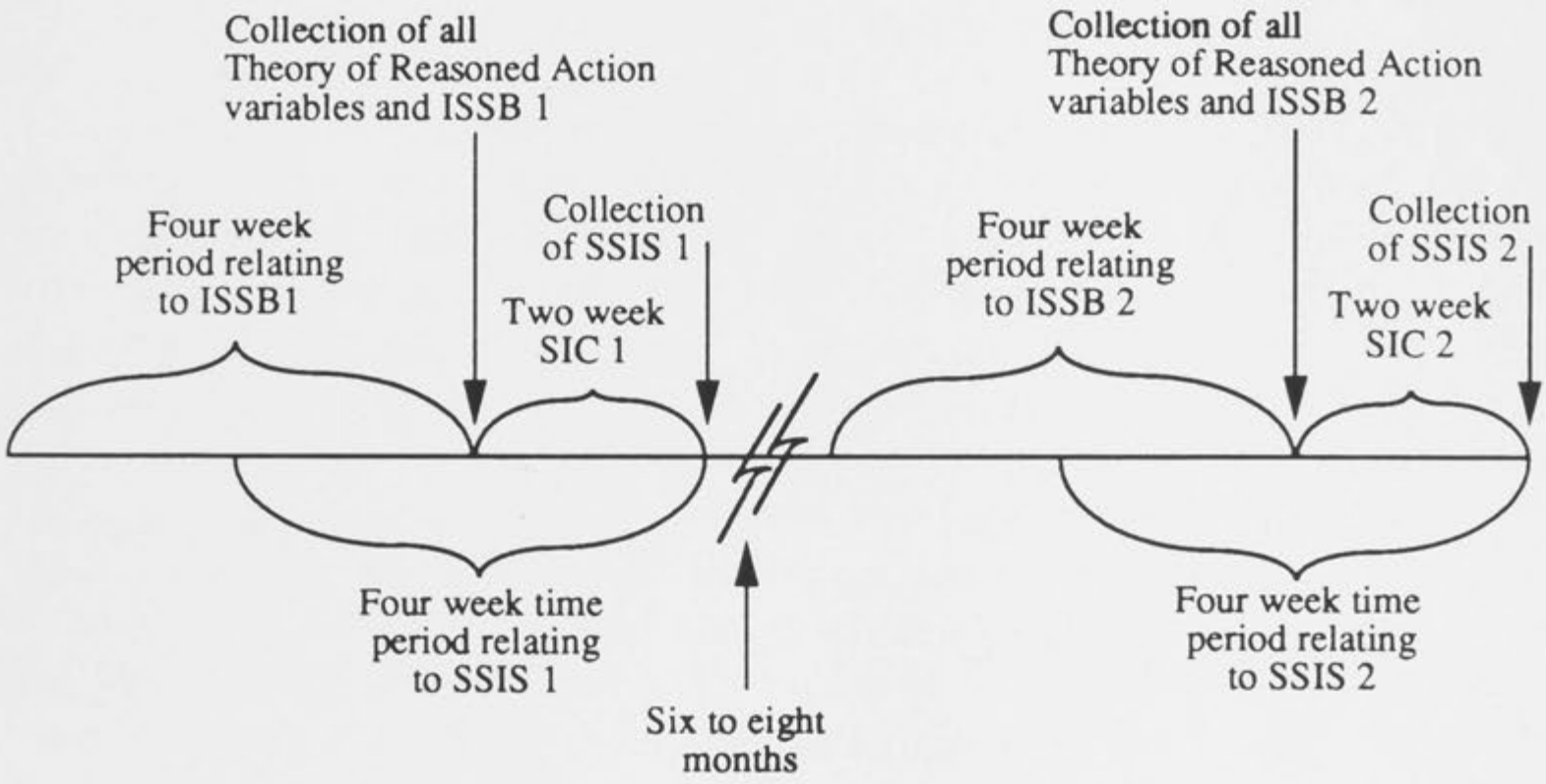
In the absence of any external criterion these two points attest to the validity of the two scales.

Analysis of the internal reliability of these scales produced a Cronbach's alpha of .86 for the social support scale and .53 for the social sabotage scale .

6.4. Procedure for Study Two

The procedure for Study Two was similar to that described previously for Study One, with the following exceptions. Owing to the increased length of the questionnaire, subjects in this study required more time than Study One. After completing the questionnaire measuring the TRA variables and the ISSB, subjects were requested to read the instructions for the SSIS (Appendix F) and were helped to complete an example provided at the beginning of the answer booklet (Appendix G). Subjects then took the instructions and answer booklet with them and were requested to look through the booklet over the following two weeks. During this two week period they completed the five SICs and at the end returned for a further visit at which they first completed the SSIS with assistance when requested, or when the scoring procedure was used incorrectly. Subjects then had their range of SIC scores determined and were given advice on sources of sodium in their diet, how to avoid them, and what products to use as alternatives. The SSIS asks respondents to indicate the frequency over the past four weeks of each of forty social interactions. This time frame encompasses the period during which the measures of TRA variable, the ISSB and SIC scores were collected. This procedure is described in the following figure:

Figure 6-1: Sequence for collection of Study Two Data



This same sequence was repeated six to eight months later when subjects returned for the collection of Time Two data. Subjects had their blood pressure taken at Time One and Time Two, and referral back to clinic staff or their general practitioner was made if appropriate. All were encouraged to maintain their low sodium diet and to have regular blood pressure checks with their general practitioner.

There were several points at which subjects could and did drop out, resulting in less numbers at each of the points of measurement. Subjects could, for example, complete the Theory of Reasoned Action Questionaire and ISSB at Time One but fail to return the SIC, or they may post the SIC and therefore not complete the SSIS. Some of this latter group returned for Time Two data collection and possibly at that time completed all data collection including the SSIS. The problems in data collection are

indicated here to explain the variation in subject numbers which will be observed in the presentation of data sets.

Where individual items were missing (for example from the total number of items in the affective attitude measure) the group mean for that item was inserted. The variable was coded missing if more than 25% of its individual items were missing. The usual situation being either all missing or only one or two items missing. This procedure of mean substitution for missing items was followed for the cognitive and affective attitude measures and the measure of specific subjective norm. The general subjective norm measure if not completed was scored missing. The score for the SIC was the mean of those completed with at least two of the five checklists required for inclusion. The score for the behavioural intention was the mean of those completed with at least three of the four questions required for inclusion. Respondents to the SSIS were informed that leaving an item blank would indicate that this interaction had not occurred at all in the preceding four week period. Hence, only non-return of the SSIS produced a missing values score for the two variables derived from this scale.

All analyses were performed with casewise deletion of missing data, and sample sizes are indicated for each analysis. The results of these analyses of the data described here are presented in the following chapter.

Chapter 7
RESULTS OF STUDY TWO

This chapter follows the format developed for the presentation of Study One results. The first section contains a description of the subjects and the nature of the distribution of the data obtained. Section Two deals with the antecedents of behavioural intention within Time One and Time Two, and from Time One to Time Two. Section Three deals with the antecedents of sodium intake again within Time One, within Time Two, and between Time One and Time Two. Section Four gives a verbal description of the results and presents models and highlights relevant findings from Time One, Time Two, and between these two data collections.

7.1. Section One: Description of Subjects and Data

Study Two subjects are different on a potentially significant variable to those employed in Study One. Study One subjects were taken from a research project primarily aimed at establishing the feasibility of maintaining a group of free living individuals on a low sodium diet. As such a considerable proportion were volunteers simply interested in health or motivated to be part of a research project. This group therefore, contained a number of people who did not have any diagnosed condition, whether potentially sodium related or not. Study Two subjects on the other hand, were taken from a group of people who had chosen, or were referred, to a clinical service provided primarily for those with a diagnosed illness (e.g., hypertension or oedema). Therefore, even though the target behaviour and the training given was identical for the two groups there is a possibility that they may differ on this potentially significant and uncontrolled variable. The following information was gained from subjects when they first entered the Low Sodium Clinic.

Table 7-1: Description of Subjects

		First Data Collection only(n = 39)	Both Data collections (n = 95)
Age	Mean	46.5	47.60
	SD	13.11	12.10
	Spread	19-66	24-79
		Percent	Percent
Sex	Male	41	44
	Female	59	56
Referral Source	Doctor	61.50	57.90
	Nurse	0.0	1.1
	Dietitian	2.60	9.20
	Friend	20.50	11.60
	Self	12.80	16.80
	Work screening	0.00	1.10
	Blood Bank	0.00	1.10
	Other	2.60	8.60
		Mean (sd)	Mean (sd)
Blood Pressure	Systolic	132.46 (15.16)	131.13 (16.50)
	Diastolic	82.74 (9.15)	82.66 (10.47)

Tests of difference between these two groups produced no significant results for any of the variables (Mann-Whitney U for sex and referral source; and 't' tests for age and blood pressure). There is therefore no reason, from the available data, to suggest a consistent bias in those individuals returning for follow-up data collection.

The referral source for Study Two differs considerably from that obtained in Study One, the main difference being in the percentage referred by medical practitioners. Of those completing Study One only 12.30% were referred from this source while the figure for Study Two was 57.90%. This difference in the percentage of referrals from medical practitioners reinforces the suggestion that Study One subjects were more 'experimental', that is, volunteers, and Study Two more 'clinical', that is, with a diagnosed health problem.

7.1.1. Data Screening and Description

The following abbreviations have been employed to denote the variables employed throughout this study.

Table 7-2: Abbreviations used in Study Two

	Time One	Time Two
Behavioural Intention	Bi1	Bi2
Affective Attitude Measure	Aft1	Aft2
Cognitive Attitude Measure	Cog2	Cog2
General Subjective Norm	Gen1	Gen2
Specific Subjective Norm	Spc1	Spc2
Inventory of Socially Supportive Behaviours	ISSB1	ISSB2
Sodium-related Social Interaction Scale:	SSIS1	SSIS2
Social Support (Positive Frequency x value)	PV1	PV2
Social Sabotage (Negative frequency x Value)	NV1	NV2
Sodium Intake Checklist	SIC1	SIC2

7.1.2. Univariate Distribution and Outliers

With the exception of the SIC and NV, all variables were univariate normal and showed no extreme outliers. The SIC was positively skewed at both Time One and Two.

	Skewness	(Error)	Kurtosis	(Error)
SIC1 (n=125)	1.00	(.23)	.22	(.43)
SIC2	1.1	(.26)	1.31	(.51)

NV at Time One was slightly negatively skewed,

	Skewness	(error)	Kurtosis	(Error)
NV1	-1.38	(.24)	1.09	(.46)

The Study One data had indicated that an additive model best described the data. In addition, transforming either or both of these Study Two variables did not alter the relationship between them, the size of the correlations varied only slightly and the scatterplot of scores was not linear for the transformed data.

To test the possibility that employing these untransformed variables affected the nature of the multiple regressions all the following analyses were carried out employing log 10 (SIC) and log 10 (inverse NV). Employing these transformations produced no change in the significance or otherwise of the multiple regression nor the beta weights. Neither was the relative size of the significant beta weights different from that obtained when employing the untransformed variables.

For these reasons, no transformations were carried out on any of the Time Two data.

7.2. Section Two: Antecedents of Behavioural Intention

7.2.1. Multiple Regression of Time One Variables on Behavioural Intention

To determine the adequacy of the standard Theory of Reasoned Action in predicting behavioural intention, all Time One Theory of Reasoned Action variables were entered into a standard multiple regression on Bi1. The results appear in the following table.

Table 7-3: Standard multiple regression of Time One TRA variables on behavioural intention (Bi1). n = 137

	Bi1	Aft1	Cog1	Gen1	Spc1	B	β	Sr^2
Aft1	.30**					.05**	.23	.04
Cog1	.23	.39**				.01	.07	.00
Gen1	-.03	.05	.11			-.17	-.15	.02
Spc1	.27**	.19*	.30**		.43	.06**	.27	.05
Mean	17.89	128.26	116.74	8.48	59.45			
SD	5.26	23.03	31.51	4.92	22.59			

$R^2 = .16$
Adjusted $R^2 = .14$
$R = .40^{**}$

* $p < .05$; ** $p < .01$

One case was detected as a multivariate outlier (Mahalanobis distance = 18.95) and was excluded from the analysis. R for regression was significant at $p < .001$ (df = 4/132, F = 6.33). The two regression coefficients for Aft1 and Spc1 differed significantly from zero (confidence limit for Aft1 .013 to .091; and for Spc1 .019 to .105). Only these two variables gave a significant independent contribution to behavioural intention, Aft1 $Sr^2 = .04$ and Spc1 $Sr^2 = .05$. The four Independent Variables together contributed .05 in shared variability.

The Theory of Reasoned Action variables, therefore, were able to predict 16% (14% adjusted) of the variation in the behavioural intention measure at Time One, and the affective attitude measure and the specific subjective norm were the significant variables in this prediction. The next step in the analysis was to enter the three social interaction measures with the original variables.

Within this analysis, the R for regression equalled .44 and was again significantly different from zero (df = 7/93, F = 3.139, p = .005). However, the three social interaction variables when entered as a block produced no significant increase in R^2.

Given this relationship of the social interaction and Theory of Reasoned Action variables, the beta weights obtained from the multiple regression of Theory of Reasoned Action variables alone will be employed in the model of prediction of behavioural intention obtained from the Time One data.

7.2.2. Multiple Regression of Time Two Variables on Behavioural Intention

As for Time One analysis, initially only Theory of Reasoned Action variables were entered into the multiple regression on Bi2. The results are presented in the following table:

Table 7-4: Standard multiple regression of all Time Two TRA variables on behavioural intention (Bi2). n = 102

	Bi2	Aft2	Cog2	Gen2	Spc2	B	β	Sr^2
Aft2	.35**					.07**	.29	.06
Cog2	.26*	.44**				.01	.03	.00
Gen2	.22*	.32**	.27**			.10	.09	.00
Spc2	.21*	.32**	.50**	.60**		.01	.05	.00
Mean	16.44	128.90	114.41	9.19	63.17			
SD	5.49	22.73	34.86	5.26	24.41			

R^2 = .14
Adjusted R^2 = .10
R = .37**

* p < .05; ** p< .01.

The R for regression was significant (df = 4/97 F = 3.88 p = .006). Only the

regression coefficient for Aft2 differed significantly from zero, contributing a significant independent amount to the prediction of RI2 (Sr^2 for Aft2 = .06). Only 14% (10% adjusted) of the variability in behavioural intention was predicted from a knowledge of the four independent variables.

Having determined the adequacy of the Theory of Reasoned Action in describing this data, a second model was tested, retaining the same variables displayed in the preceding table but with the addition of the three social interaction measures. The results appear in the following table.

Table 7-5: Standard multiple regression of all Time Two independent variables on behavioural intention (Bi2).
n = 67

	Bi2	Aft2	Cog2	Gen2	Spc2	ISSB2	PV2	NV2	B	β	Sr^2
Aft2	.35**								.06	.22	.04
Cog2	.21*	.31**							.02	.09	.00
Gen2	.23*	.40**	.24*						.07	.06	.00
Spc2	.20	.24*	.46**	.58					.01	.03	.00
ISSB2	-.12	.04	.01	.15	.14				-.04	-.13	.02
PV2	.24*	.25**	.19	.32**	.31**	.16			.01	.16	.02
NV2	.27*	.16	-.02	.04	.03	-.19	-.00		.11	.20	.04
Mean	16.55	128.05	115.52	10.08	64.79	79.84	97.26	-4.94			
SD	5.63	22.20	32.67	5.17	22.84	21.33	82.61	10.60			

R^2 = .22
Adjusted R^2 = .13
R = .47*

* p < .05; ** p< .01.

The R for regression was significant at p < .01 (df = 7/59, F = 2.49). However, no individual variable achieved a significant beta weight in this analysis.

Stepwise removal of non-significant variables indicated only Aft2 and NV2 with a significant beta weight. This reduced model is presented in the following table:

Table 7-6: Standard multiple regression of Time Two affective attitude measure and the negative SSIS on Bi2 after removal of non-significant independent variables. n = 71

	B	β	Sr^2	
Aft2	.07**	.31	.09	R^2 = .17**
NV2	.13*	.24	.06	Adjusted R^2 = .15
				R = .42

* p < .05; ** p< .01.

R for regression was again significant at p < .01 (df = 2/68, F = 7.13). Both variables contributed a significant unique amount to R^2, with Aft2 Sr^2 = .09 and NV2 Sr^2 = .06. Introduction one at a time of each non-significant variable produced no significant change in R^2 nor a significant change in the beta weight for Aft2 or NV2. All non-significant variables were entered as a block and again the change in R^2 was not significant. Therefore, the beta weights from this reduced model are employed to describe the Time Two prediction of Behavioural Intention.

7.2.3. Multiple Regression of Time One Variables on Time Two Behavioural Intention

This section tests the significance of social interactions measured at Time One in predicting the variation in behavioural intention measured at Time Two. Firstly, the three social interaction variables measured at Time One were entered with the predictors of Bi at Time One in a multiple regression on Bi2. This enabled a test for any change in the relative importance of those variables when predicting immediate intention as compared to intention six to eight months in the future.

The following table contains the results from this analysis, that is, all Time One Independent Variables in a multiple regression on Time Two BI.

Table 7-7: Standard Multiple Regression of all Time One TRA predictors of behavioural intention and all Time One Social Interaction measures on Time Two behavioural intention. n = 79

	Bi2 (Pearson r)	B	β	Sr^2	
Aft1	.19*	.02	.09	.00	
Cog1	.09	.00	.02	.00	
Gen1	.02	-.10	-.10	.01	R^2 = .09
Spc1	.12	.02	.07	.00	Adjusted R^2 = .01
ISSB1	-.01	-.01	-.05	.00	R = .31
PV1	.25*	.02	.24	.05	
NV1	.10	.04	.10	.01	

* p < .05; ** p< .01.

R for regression was not significant (df, 2/76 F = 1.12, p = .36) nor were any of the beta weights. Stepwise removal of variables in ascending order of significance (i.e., from lowest F value) showed no significant change in beta weights for any variable other than the beta for PV1 becoming significant. It would appear that only the social support variable PV1 predicts behavioural intention at Time Two.

In the second analysis in this Section, the social interaction variables from Time One are combined with significant Theory of Reasoned Action Time Two predictors of Time Two behavioural intention. The Theory of Reasoned Action would suggest that the 'extraneous variable' of social interaction, when measured at some considerable time before other Theory of Reasoned Action independent variables would affect behavioural intention only through these other variables.

Table 7-8: Standard Multiple Regression of Time One Social Interaction measure and Time Two Affective Attitude measure on Time Two behavioural intention

	Bi2	Aft2	B	β	Sr^2	
Aft2	.33**		.06**	.27	.07	R^2 = .15*
ISSB1	-.02	-.05	-.01	-.04	.00	Adjusted R^2 = .11
NV1	.12	.07	.03	.07	.00	R = .39
PV1	.25**	.22*	.02*	.21	.04	

* p < .05; ** p< .01.

It can be seen from these results that specific social support measured at Time One predicts behavioural intention at Time Two over the affective attitude measure at Time Two, this latter measure (Aft2) being the only significant Time Two Theory of Reasoned Action predictor of intention. This result suggests that the degree of social support specific to the behaviour experienced in the early maintenance stage has an effect on the behavioural intention held in the later maintenance stage. The results also suggest that this effect is independent of the intra-psychic variables proposed by the Theory of Reasoned Action as predictors of intention.

7.3. Section Three: Antecedents of Sodium Intake

7.3.1. Multiple Regression Time One Variables on SIC1

All Time One variables proposed by Theory of Reasoned Action were entered into a standard multiple regression on SIC1. The results appear in the following table:

Table 7-9: Standard multiple regression of Time One TRA variables on the SIC. n = 118

	SIC1	Bi1	Aft1	Cog1	Gen1	Spc1	B	β	Sr^2
Bi1	-.48**						-.49**	-.47	.18
Aft1	-.20*	.31*					-.01	-.05	.00
Cog1	-.15	.23*	.36**				-.00	-.02	.00
Gen1	-.09	.06*	.09	.20			-.08	-.07	.00
Spc1	-.17*	.34**	.21*	.29	.44		.01	.03	.00
Mean	7.13	17.86	127.48	115.51	8.34	58.44			
SD	5.43	5.25	23.47	30.97	4.93	22.87			

$R^2 = .24$
Adjusted $R^2 = .21$
$R = .49$**

* $p < .05$; ** $p < .01$

The multiple correlation coefficient for this regression was significant at $p < .01$ ($df = 5/112$, $F = 7.14$). Behavioural intention was the only independent variable which achieved a significant regression coefficient independently accounting for 18% of the variation in sodium intake. The five independent variables combined accounted for a further 6% in shared variability, with 24% (21% adjusted) of the variability in SIC1 predicted from a knowledge of these variables. Therefore the test of the Theory of Reasoned Action variables support strongly the original formation of the theory as behavioural intention is by far the best predictor of sodium intake.

To test for any additional effect of social interaction on sodium intake, independent of the variables proposed by the Theory of Reasoned Action the three social support measures were entered with the above independent variables in a multiple regression on SIC1. The results are presented in the following table:

Table 7-10: Standard multiple regression of all Time One independent variables on SIC1. n = 100

	SIC1	Bi1	Aft1	Cog1	Gen1	Spc1	ISSB1	PV1	NV1	B	β	Sr^2
Bi1	-.44**									-.47**	-.36	.14
Aft1	-.19*	.32**								.00	.02	.00
Cog1	-.06	.17*	.43**							.00	.02	.00
Gen1	-.01	.04	.13	.28**						-.05	-.04	.00
Spc1	-.00	.29**	.28**	.33**	.45**					.05	.20	.03
ISSB1	.11	-.07	.04	-.05	.06	-.04				.05	.14	.02
PV1	-.19*	.27**	.33**	.23	.18	.25**	.21			-.02	.19	.03
NV1	-.36**	.12	.24**	.07	.00	.05	.02	-.05		-.14**	-.34	.10
Mean	7.61	17.83	124.39	116.47	8.26	58.42	80.03	121.56	-12.54			
SD	6.16	5.35	20.61	30.18	5.03	23.47	19.00	73.92	14.54			

R^2 = .35
Adjusted R^2 = .29
R = .59**

* p < .05; ** p < .01

The R for regression was significant at p < .01 (df = 8/91, F = 6.14). R^2 change for stepwise entry of the social interaction variable as a block was significant. (R^2 change = .12 F change = 5.74 sig = .00). Behavioural intention and social sabotage both had regression weights significantly greater than zero (confidence intervals of -.686 to -.257 for Bi1 and -.217 to -.068 for NV1). These two variables each contributed a significant independent amount to R^2 (Bi1, Sr^2 = .14; NV1, Sr^2 = .10). A total of 35% (29% adjusted) of variation in sodium intake was explained from knowledge of the eight variables.

Stepwise removal of non-significant independent variables produced no change in the relative importance of the beta weights. For the multiple regression of social sabotage and affective attitude only on SIC1, R = .54, R^2 = .29 (adjusted R^2 = .28). The addition of all other variables entered as as a block did not significantly change the R^2, neither did any independent variable entered singly achieve a significant beta weight. The beta weights for Bi1 and NV1 obtained from the full analysis will be employed in the model representing prediction of Time One SIC.

7.3.2. Multiple Regression of Time Two Variables on SIC2

All Time Two variables proposed by the Theory of Reasoned Action were entered into a multiple regression on SIC2. The results appear in the following table:

Table 7-11: Standard Multiple Regression of Time Two TRA variables on SIC2. n = 85

	SIC2	Bi2	Aft2	Cog2	Gen2	Spc2	B	β	Sr^2
Bi2	-.27**						-.13	-.12	.01
Aft2	-.43**	.36**					-.08**	-.34	.08
Cog2	-.22*	.22*	.45**				-.00	-.01	.00
Gen2	-.29**	.17	.38**	.29**			-.17	-.15	.01
Spc2	-.20*	.18*	.33**	.48**	.58**		.01	.02	.00
Mean	8.80	16.59	129.05	115.39	9.58	65.09			
SD	5.79	5.51	22.69	34.83	5.14	23.61			

$R^2 = .22$
Adjusted $R^2 = .17$
$R = .47$**

* p < .05; ** p< .01.

R for regression was significantly different from zero (df = 5/79, F = 4.42, p = .001). A significant regression coefficient was obtained by the affective attitude measure only (confidence interval for Aft2 is - .142 to -.024). This measure independently contributed 8% to R^2, with a further 12% in shared variance and a total of 22% obtained from a knowledge of the five variables. This result is considerably different from that predicted by the the Theory of Reasoned Action and also that obtained in any other cross sectional analysis in this study. Several cases were identified as possible outliers as they were close to the Mahalanobis distance for exclusion or with standardised residuals approaching the third standard deviation from the mean.

The removal of these cases did not change the relative significance of the variables nor did any additional variable achieve significance. There is no reason to believe that the result is dependent only on the effect of extreme cases on a relatively small sample size.

These results differ considerably from those obtained from Time Two of Study One. To test whether this difference resulted from the changes made in the measurement of the variables involved, the measures employed in the first study (see Chapter 5) were extracted from the raw data of Study Two Time Two, and entered into a multiple regression on SIC2. The results appear in the following table.

Table 7-12: Supplementary analysis : Multiple Regression of Time Two TRA variables, derived as for Study One, on SIC2. n = 83

	SIC2	Bi2	Aft2	Cog2	Gen2	Spc2	B	β	Sr^2
Bi2	-.30**						-.55	-.15	.02
Aft2	-.45**	.39**					-.54**	-.36	.09
Cog2	-.21*	.19*	.40**				-.00	-.02	.00
Gen2	-.23*	.19*	.33**	.29**			-.10	-.10	.01
Spc2	-.16	.23*	.24*	.38**	.58**		.00	.03	.00
Mean	8.56	4.32	22.69	70.95	9.69	65.45			
SD	5.40	1.44	3.62	30.70	5.09	20.19			

$R^2 = .23$
Adjusted $R^2 = .18$
$R = .48$**

* p < .05; ** p< .01.

There appears little, if any, difference between the results obtained by the original measures employed in Study One or the expanded versions employed in Study Two. It is unlikely therefore, that the difference in results between the two studies is simply an artifact of the differing methodology employed. The expanded measures are used in all further analysis.

To test the possibility of a unique contribution of social interaction to the prediction of Sodium intake, the three Time Two social interaction measures were added to the Time Two Theory of Reasoned Action variables in a multiple regression onto SIC2. The results appear in the following table:

Table 7-13: Standard Multiple Regression of all Time Two variables on SIC2. n = 66

	SIC2	Bi2	Aft2	Cog2	Gen2	Spc2	ISSB2	PV2	NV2	B	β	Sr^2
Bi2	-.37**									-.22	-.24	.05
Aft2	-.40**	.36**								-.06*	-.27	.05
Cog2	-.23*	.21*	.31**							-.03	-.17	.02
Gen2	-.13	.24	.38**	.25*						-.02	.02	.00
Spc2	-.00	.21*	.47**	.55**						.05	-.24	.03
ISSB2	.05	-.13	.05	.01	.18	.15				.01	-.02	.00
PV2	-.23*	.24*	.25*	.19	.31**	.30**	.16			-.01	-.14	.01
NV2	-.10	.26*	.17	-.02	.05	.04	-.19	08		.00	.00	.00
Mean	8.18	16.53	128.55	115.52	10.23	65.36	79.67	97.99	-5.00			
SD	5.01	5.67	21.93	32.92	5.06	22.53	21.45	83.02	10.67			

R^2 = .27
Adjusted R^2 = .17
R = .52*

* p < .05; ** p< .01.

R for regression was significant at p < .05 (df = 8/57, F = 2.07). R^2 change for the stepwise addition of all social interaction variables was not significant. The affective attitude measure was the only Independent Variable to achieve a beta weight significant at p < .05. Stepwise removal of non-significant variables did not find any other variable as reaching significance. This suggests that within this sample only the affective response to carrying out the behaviour was directly significant in determining the actual performance of the behaviour. Neither the other Theory of Reasoned Action variables nor any of the social interaction measures contributed a significant independent amount to the long term maintenance of a low sodium diet, when measured contemporaneously to the dietary measure.

7.3.3. Time One Variables as Predictors of Time Two Sodium Intake

The first analysis in this section determines if the social interaction measures from Time One add anything to the prediction of SIC2 over that gained by behavioural intention from Time One. The results appear in the following table:

Table 7-14: Standard Multiple Regression of Time One behavioural intention and Time One Social Interaction measures on SIC2. n = 69

	SIC2	Bi1	ISSB1	PV1	NV1	B	β	Sr^2
Bi1	-.37**					-.36**	-.37	.11
ISSB1	.07	.03				.03	.11	.01
PV1	-.04	.39**	.21*			.00	.06	.00
NV1	-.29**	.09	.11	-.10		-.09*	-.26	.06

R^2 = .21
Adjusted R^2 = .17
R = .46**

* p < .05; ** p< .01.

R for regression was significant at p < .01 (df = 4/64, F = 4.39). Both behavioural intention and social sabotage contributed a significant unique amount to R^2 with Bi1 Sr^2 = .11 and NV1 Sr^2 = .06. The four independent variables combined contributed a further 3% in shared variability. Altogether 21% (17% adjusted) of the variability in sodium intake was predicted from a knowledge of the four independent variables.

The Theory of Reasoned Action would accommodate this result as the measurement of social sabotage occurred after the measurement of Time One behavioural intention. Even though the period the social sabotage occurred in ranged from two weeks before the collection of the Theory of Reasoned Action variables, the actual completion of the SSIS was two weeks after. However, the Theory clearly states that this variable would not add to the prediction of Time Two sodium intake over Time Two Theory of Reasoned Action variables. To test the support for this prediction the second analysis in this section tests the addition of Time One social interaction measures to the Time Two affective attitude measure and behavioural intention in a multiple regression on SIC2. Bi2 was included in this analysis as it had approached significance in previous analyses and because of its obvious importance in Study One.

Table 7-15: Multiple Regression of Time One Social Interaction measures and Time Two Affective Attitude and Behavioural Intention on SIC2. n = 71

	SIC2	Bi2	Aft2	ISSB1	PV1	NV1	B	β	Sr^2
Bi2	-.24*						-.18	-.17	.02
Aft2	-.37**	.29**					-.07*	-.26	.06
ISSB1	.06	-.08	-.06				.02	.06	.00
PV1	-.04	.23*	.19	.13			-.00	.01	.00
NV1	-.36	-.01	.18	.10	-.07		-.12*	-.32	.10

R^2 = .26
Adjusted R^2 = .20
R = .51**

* p < .05; ** p< .01.

R for regression was significant at p < .01 (df 5/65, F = 4.48). Both the affective attitude measures taken at Time Two and the social sabotage measure from Time One contributed a significant unique amount to the sodium intake measure at Time Two. (Aft2, Sr^2 = .06; NV1, Sr^2 = .10). Again, Bi2 did not achieve significance.

These data therefore, do not support the Theory of Reasoned Action proposition that variables extraneous to the model, measured at some point prior to the measurement of model variables, would add nothing to the prediction of behaviour at the second point of measurement. These data do support the model proposed in Chapter Two of this thesis, that social interaction experienced in the early maintenance stage affect long term behaviour maintenance irrespective of the contribution made by the Theory of Reasoned Action variables measured during long term maintenance.

Given the clear contribution of Time One behavioural intention and Time One social sabotage, and of Time Two affective response, these three variables were entered together into a multiple regression onto Time Two sodium intake. The beta weights derived from this analysis are employed in Figure 7.3 which describes the overall results of the longitudinal model.

Table 7-16: Standard Multiple Regression of significant Time One and Time Two variables on SIC2. n = 74

	SIC2	Bi1	Aft2	NV1	B	β	Sr^2
Bi1	-.37**				-.30**	-.29	.08
Aft2	-.35**	.22*			-.06**	-.25	.06
NV1	-.33**	.11	.15		-.10**	-.26	.07

R^2 = .28
Adjusted R^2 = .25
R = .53**

* p < .05; ** p < .01

R for regression was significant (df, 3/70 F = 8.93, p = .0000). All these independent variables were significantly different from zero (confidence interval for Bi1 = - .514 to - .080; for Aft2 = -.119 to -.010; for NV1 = -.179 to -.019). These three variables each contributed a significant unique amount to the prediction of sodium intake at Time Two (Sr^2 for Bi1 = .08 for Aft^2 = .06 and NV2 = .06). A further 8% was accounted for by shared variance and a total of 28% (25% adjusted) in the variability of Time Two sodium intake was predicted from a knowledge of these three variables.

7.4. Discussion of Study Two Results

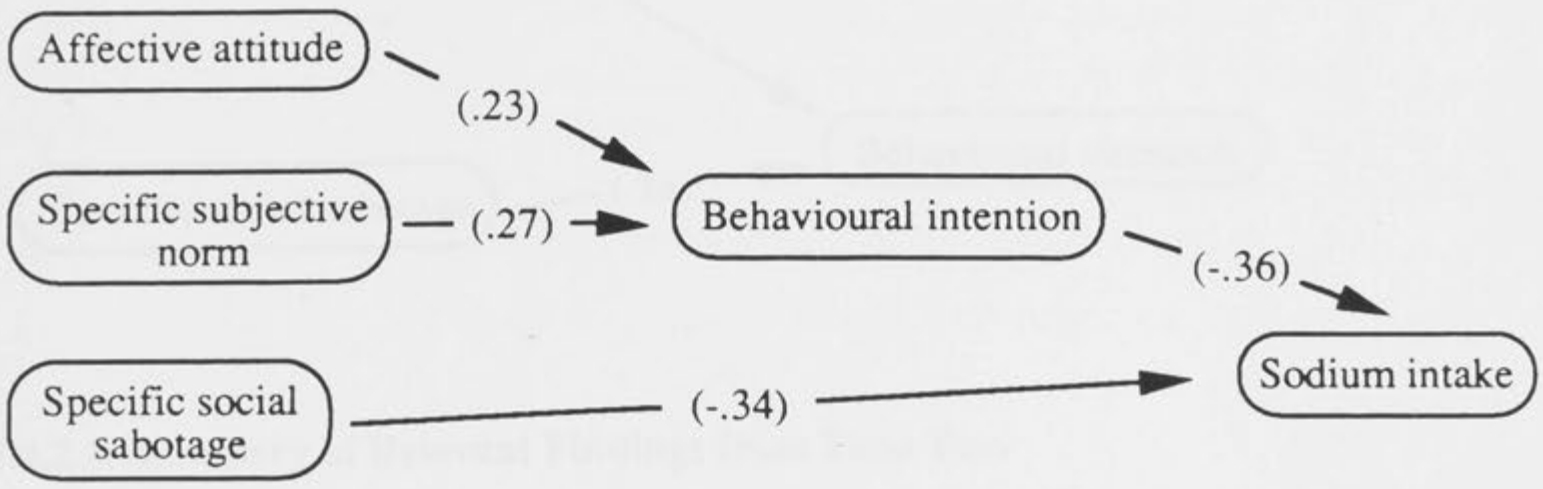
7.4.1. Time One

Time One prediction of behavioural intention supports the original Theory of Reasoned Action in that no social interaction measure adds significantly to the prediction of behavioural intention nor do any of these measures achieve a significant regression weight. Both the affective attitude measure and the subjective norm measure (consisting of the summation of all significant others by motivation to comply) do significantly contribute to the prediction of behavioural intention.

Examination of the predictors of sodium intake at Time One found that when Theory of Reasoned Action variables are considered alone, behavioural intention is the only variable which achieves a significant beta weight. However, as proposed in this thesis, the measure of sodium related social sabotage provides a significant independent contribution to prediction of sodium intake, over that of behavioural intention alone. The relationship is such that the less the social sabotage the greater the adherence to a low sodium diet.

These relationships are presented in the diagram below, where the numbers in brackets are beta weights for the independent variables on the left, obtained from the multiple regression onto the dependent variables on the right. The specific analysis from which each regression weight is taken is indicated in the text above.

Figure 7-1: Overall results derived from Time One data



7.4.1.1. Summary of Relevant Findings from Time One

1. AFFECTIVE ATTITUDE AND SPECIFIC SUBJECTIVE NORM BOTH CONTRIBUTE TO BEHAVIOURAL INTENTION.
2. NEITHER GENERAL NOR SPECIFIC SOCIAL INTERACTIONS CONTRIBUTE TO BEHAVIOURAL INTENTION.
3. THE DEGREE OF SOCIAL SABOTAGE SPECIFICALLY RELATED TO SODIUM INTAKE DOES HAVE A NEGATIVE EFFECT ON ACTUAL INTAKE OVER THAT OF BEHAVIOURAL INTENTION ALONE.

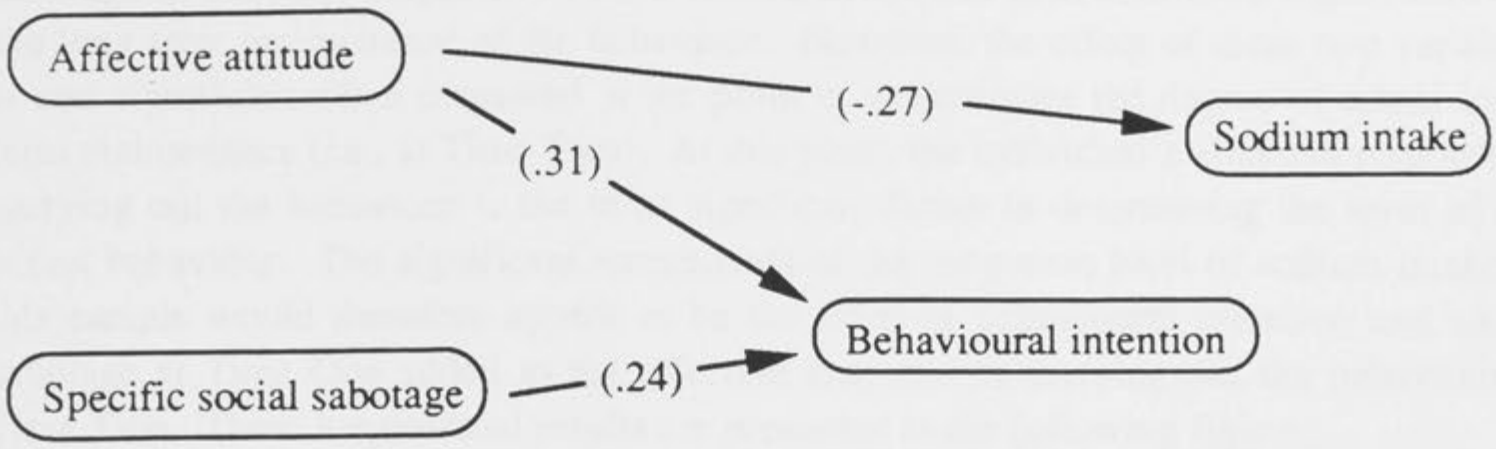
7.4.2. Time Two

As with Time One, the affective attitude measure contributes significantly to the prediction of behavioural intention. However, the measure of social sabotage also achieved a significant regression weight in this analysis. While it is acknowledged that the measure of social sabotage was actually taken after the measurement of behavioural intention, the time frame for the occurrence of the sabotage commenced two weeks prior to the measurement of intention. Additionally, it is unlikely that intention causes sabotage, particularly as the sign of the beta weight would imply that causality in this direction would mean that low behavioural intention caused high social sabotage.

The data do not support the Theory of Reasoned Action in the prediction of sodium intake. Nor is there evidence for the significance of social interactions in determining this behaviour. The only significant predictor of sodium intake at this time was the affective attitude towards carrying out the behaviour. Behavioural intention approached significance at the $p < .05$ level but did not achieve this level in the full model (with all variables entered) nor in any reduced model (e.g., with just the Theory of Reasoned Action variables).

The overall results with beta weights are presented in the following diagram.

Figure 7-2: Overall results derived from Time Two data



7.4.2.1. Summary of Relevant Findings from Time Two

1. BOTH AFFECTIVE ATTITUDE AND THE LEVEL OF SOCIAL SABOTAGE ARE SIGNIFICANT IN PREDICTING BEHAVIOURAL INTENTION.
2. NEITHER BEHAVIOURAL INTENTION NOR ANY OF THE SOCIAL INTERACTION MEASURES ARE SIGNIFICANT PREDICTORS OF SODIUM INTAKE.
3. THE AFFECTIVE ATTITUDE MEASURE IS THE ONLY SIGNIFICANT PREDICTOR OF SODIUM INTAKE IN THIS DATA.

7.4.3. Prediction of Time Two Behavioural Intention and Sodium Intake from Time One Measures

The results of the longitudinal analysis strongly support the thesis that the degree of social sabotage experienced in the initial period of adoption of a health-related behaviour has an effect on both the short and long-term maintenance of that behaviour. This relationship is in addition to the role of the psychological variables proposed by the Theory of Reasoned Action.

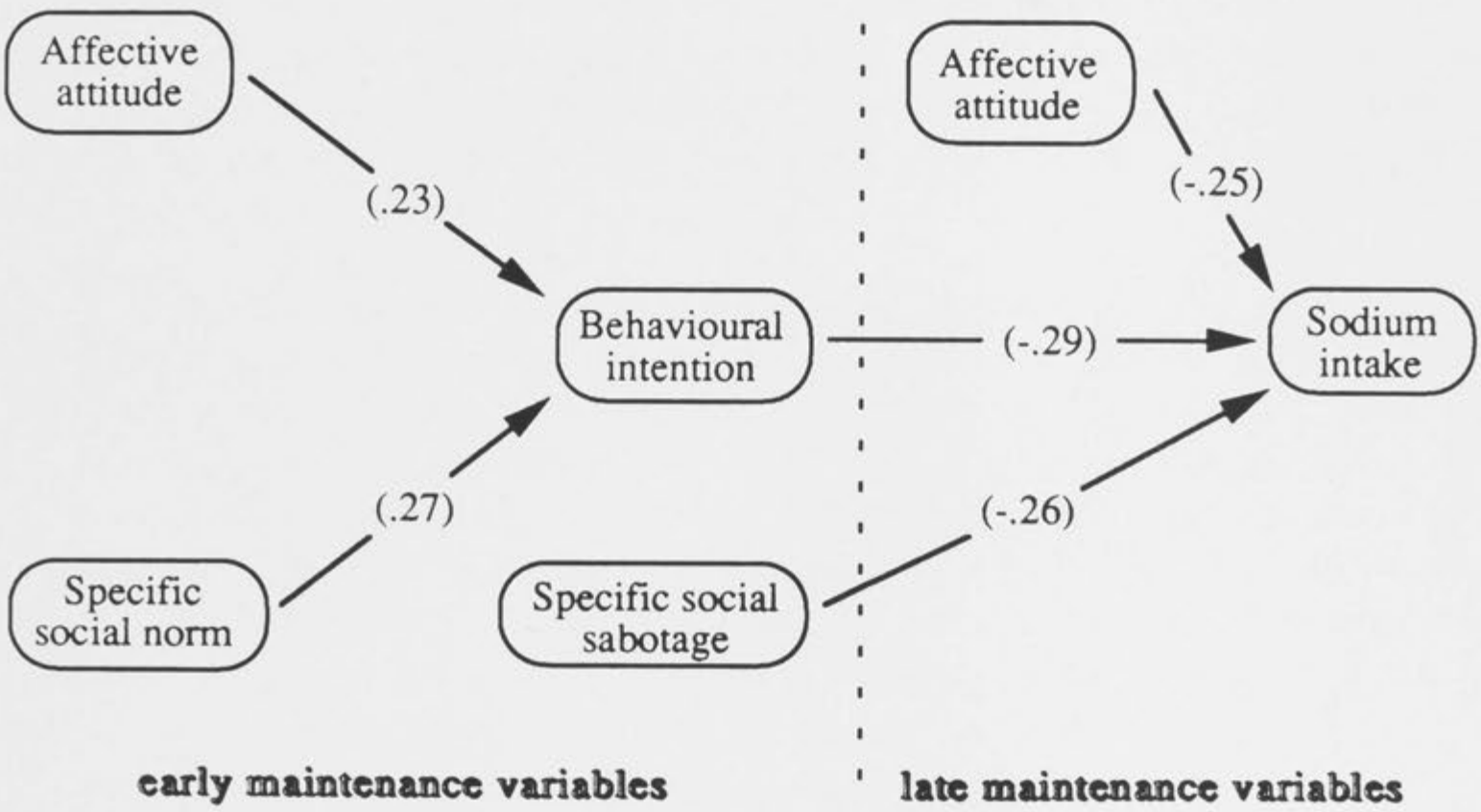
The role of general social support does not reach significance at any level of analysis. However, the direction of the relationship is consistent with that found in Study One, that is the greater the degree of general social support, the lower the intention to maintain and the lower the actual maintenance of a low sodium diet.

Social support specifically related to sodium intake does appear significant in its effect on the formation of behavioural intention. The results from Time One suggest that this effect is indirect, being mediated through the affective attitude. However, the greater the time between measuring the independent variables and behavioural intention, the greater the relative importance of specific social support in determining this intention. The unique contribution of Time One specific social social support to Time Two behavioural intention is maintained even when the significant Time Two Theory of

Reasoned Action predictor of Time Two sodium intake (that is affective attitude at Time Two) is added to the regression.

The overall results suggest that the level of behavioural intention and social sabotage in the early stages of a health-related behaviour both contribute significantly to the long term maintenance of the behaviour. However, the effect of these two variables is non-significant when measured at the point of determining the degree of actual long-term maintenance (i.e., at Time Two). At this point, the individual's affective response to carrying out the behaviour is the most significant factor in determining the level of the actual behaviour. The significant antecedents of the long term level of sodium intake in this sample would therefore appear to be the level of behavioural intention and social sabotage at Time One added to the affective response to carrying out the behaviour at Time Two. These longitudinal results are presented in the following figure

Figure 7-3: Overall longitudinal results



7.4.3.1. Summary of Relevant Findings from the Longitudinal Study

1. THE ONLY SIGNIFICANT TIME ONE PREDICTOR OF TIME TWO BEHAVIOURAL INTENTION IS THE DEGREE OF SPECIFIC SOCIAL SUPPORT. THIS TIME ONE VARIABLE CONTRIBUTES SIGNIFICANTLY EVEN OVER THE AFFECTIVE ATTITUDE MEASURE AT TIME TWO.

2. THE SIGNIFICANT PREDICTORS OF TIME TWO SODIUM INTAKE ARE TIME ONE BEHAVIOURAL INTENTION AND SPECIFIC SOCIAL SABOTAGE, AND TIME TWO AFFECTIVE ATTITUDE.

The results of multiple regression analysis of data obtained in two longitudinal studies have been presented in the current chapter and Chapter Five. This analysis enables the general conclusion to be drawn that a number of aspects of the social environment affect the performance of a health-related behaviour over and above the respondents' attitudes, subjective norms and intentions. A synthesis and further discussion of the implications of these results is given in the next, final, Chapter of this thesis.

Chapter 8

SYNTHESIS OF FINDINGS AND FUTURE DIRECTIONS

The main argument presented in this thesis has been that social interactions affect health-related behaviour irrespective of psychological phenomena such as those suggested by the Theory of Reasoned Action. Evidence was presented in Chapters One and Two which supports the Theory of Reasoned Action as being the best choice, for this research, as model of psychological phenomena related to health behaviour. This was argued due to ease of operationalising the variables, and that previous research has found this model generally capable of accounting for more variability in behaviour than other competing models. In addition to this research on individual psychological factors, other investigations have presented theoretical and clinical arguments indicating the significance of social interactions in determining the adoption of and adherence to a healthy lifestyle or a health-related behaviour.

The present research was designed to examine the theoretical argument that social interactions contribute to the performance of a specific health-related behaviour (sodium intake) independently of the contribution to this behaviour made by the psychological factors contained within the Theory of Reasoned Action. The first study operationalised variables following the recommendations of the authors of the Theory of Reasoned Action and, additionally, employed a general measure of social support, the validity and reliability of which had already been established. The second study developed more detailed and arguably more valid and reliable measures of the Theory of Reasoned Action variables, and also measures of others' behaviour which were supportive and which sabotaged the performance of the target behaviour. This final chapter draws together the findings from both studies.

8.1 The Role of Attitude and Intention In The Maintenance of a Low Sodium Diet

As discussed in Chapter Two, the Theory of Reasoned Action proposes the intention to carry out a behaviour as the immediate determinant of performing that behaviour, and that any other variable measured prior to or simultaneously with the measurement of behavioural intention would contribute to the performance of the behaviour *only* through its effect on that intention.

This original formulation of the Theory of Reasoned Action was tested on four separate occasions within this research. The target behaviour, adherence to a low sodium diet, was identical on each occasion, with the measurement employed in Study One Time

One being slightly different as described in Chapter Four. The measurement of behavioural intention was similar on each occasion, with Time One of Study One again employing a less finely graduated scale. Other Theory of Reasoned Action variables were identical within each study, with Study Two employing more psychometrically and theoretically sound versions of the scales employed in the first study.

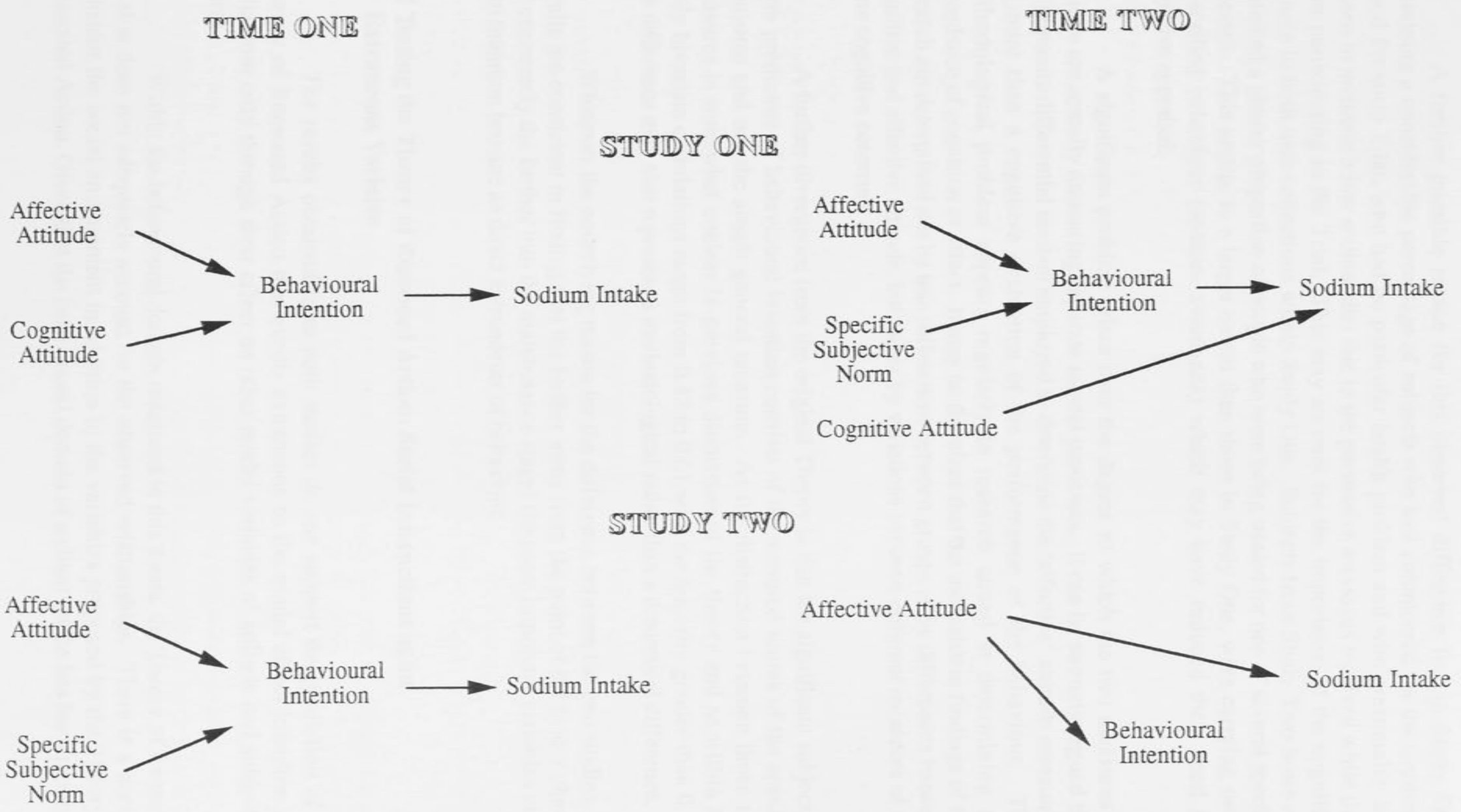
One potentially significant difference between the two studies is the original reason each subject group had for clinic attendance. The subjects in Study One were primarily volunteers taking part in a research project simply testing the feasibility of gathering a group of people who would change to and maintain a low sodium diet. These subjects therefore participated primarily out of curiosity or willingness to be involved in 'scientific research' or a desire to adopt a lifestyle which would reduce the risk of future health problems. The subjects in Study Two however, were already diagnosed as having, usually, chronic health problems for which a low sodium diet was the prescribed treatment. It may be, therefore, that differences in the results obtained from these two studies follow from differences in this original motivation for participation.

Ajzen (1985) has described the intake of dietary sodium as being primarily under volitional control and an acceptable behaviour for testing the validity of the Theory of Reasoned Action. Therefore, even taking into account the changes in measures and the differences between subject groups, the theory would predict that the relationship between variables would be consistent across all four points of measurement. This relationship being that affective attitude and a measure of general subjective norm would be the only significant Theory of Reasoned Action antecedents of behavioural intention, and that behavioural intention would be the only significant Theory of Reasoned Action antecedent of actual behaviour. As has been indicated in the results section of both studies this relationship has not been consistently found. The relationship between all four cross sectional data points is reproduced below.

The first point to note is that the sequential nature of the variables proposed by the Theory of Reasoned Action is not maintained. Of particular significance in both Time Two results is the emergence of variables other than behavioural intention as directly affecting behaviour. In Study One the cognitive attitude measure is significant even though behavioural intention accounts for a considerable percentage of the variation in sodium intake. In Study Two, Time Two behavioural intention did not achieve a regression weight significantly greater than zero. However, in this case it was the affective attitude measure which achieved significance.

This marked difference between the long term maintenance stage of the two studies may have resulted from the two methods employed to measure the variables. This does not appear to be the case. Table 12 of Chapter Seven indicates that even with variables derived as for Study One, the data thus derived for Study Two does not produce different results from that obtained with the expanded versions of the measures. At worst what can be stated is that there appears to have been little benefit gained from the development of more psychometrically and theoretically 'sound' measures.

Figure 8-1: Significant relationships between the Theory of Reasoned variables within all four data points



A further possible reason for this observed difference lies in Study One containing a considerable percentage of subjects who had volunteered for the Canberra Blood Pressure Trial, who had no particular health problem and who presumably had chosen to maintain a low sodium diet due to the persuasive messages received while they were participating in the Trial. This may account for the importance of the cognitive attitude in both data collections within Study One. Subjects from Study Two however, contained a greater proportion of people who were being treated for one of several specific illnesses. This group, to a larger extent than those in Study One, were carrying out a prescribed behaviour (sodium avoidance) which may have reduced their need for cognitive appraisal.

A significant problem arises over the degree to which the two measures of attitude are actually measuring separate mental processes. It can be strongly argued that the semantic differential method employed to determine the 'affective' attitude measure is no more than a cognitive evaluation of the performance of the behaviour. This methodological problem appears regularly in research aimed at determining the precedence of cognition or affect. It may be therefore that the inconsistent findings of this research are determined not by true differences between groups or by differences between cognitive and affective attitude, but rather by variations between different measures of the same cognitive construct.

A further divergence from the original Theory is that the significant subjective norm predictors of behavioural intention consists of the summed scores of the specific measures and not the single general measure. As the distinction between those two measures is somewhat unclear in previous discussion of the theory and as within this study bivariate correlations range from 0.43 to 0.61 with the majority greater than 0.55, this difference may also represent a methodological rather than a theoretical difference.

Whatever the underlying reason for the difference between the two studies, the results are consistent in finding that the further away from the point of behaviour change (or conversely the further into the maintenance stage) the more important variables other than intention become as direct antecedents of behaviour.

8.2 Testing the Theory of Reasoned Action: Social Interactions as an Extraneous Variable

The results obtained from both studies *do not* support the prediction of the Theory of Reasoned Action that events extraneous to the model affect intention and behaviour only through their effect on other model variables of attitude and subjective norm.

Within the behavioural domain measured in this thesis, the Theory of Reasoned Action does not adequately account for the observed relationships. There is a need to consider the social environment in addition to the variables proposed by the Theory of Reasoned Action. Given that the behavioural domain of sodium intake has been proposed

by Ajzen (1985) as under volitional control and therefore suitable for a test of the theory (see Chapter Two) it is hard to dismiss these findings as an artifact of the specific activity investigated. This point is developed below.

It may be that the wide range of specific behaviours which constitute an overall 'health-related' behaviour preclude any such behavioural domain as suitable for the application of the Theory of Reasoned Action, in that none are truly under volitional control. A more suitable accommodation of the results of this investigation would be provided by the Theory of Planned behaviour, being the extrapolation proposed by Ajzen, (1985; Ajzen, 1988; Ajzen & Madden, 1985; Schifter & Ajzen, 1985) of the original Theory of Reasoned Action.

The first point of departure from the original model occurred in the prediction of sodium intake in Time One Study One, where general social support contributed a significant unique amount to the prediction of sodium intake. As the measurement of social support was taken at the same time as the measurement of behavioural intention the Theory of Reasoned Action would predict that it should achieve a non-significant beta weight when combined with behavioural intention in a multiple regression onto the behavioural measure.

The second and main test of the sequential nature of variables proposed by the Theory of Reasoned Action was planned between social interactions measured during early maintenance and the significant antecedents of both intention and behaviour occurring during the later maintenance stage. The Theory would suggest that knowledge of an event occurring between the measurement of independent and dependent variables may well add to the prediction achieved by the independent variables alone.

Proponents of the Theory argue that this apparent unique contribution is due to the event causing changes in the independent variables between the point of their measurement and the measurement of the dependent variable. This argument may be employed to defend the Theory of Reasoned Action against the findings of Study Two Time One, where specific social sabotage added to the prediction of sodium intake over all other variables. At this time, the measurement of social interaction took place after the measurement of the other independent variables.

A further difficulty arises here as with any correlational analysis and particularly where a relatively new construct such as social sabotage is employed. This general problem is a need for evidence to support the proposed direction of causation between variables. The data support a consistent and, compared to the other variables employed, relatively strong relationship between social sabotage and sodium intake. However, it is possible to argue that the degree of adherence to a low sodium diet causes the degree and type of sodium specific social interactions experienced, and not as is proposed here that causality is in the reverse direction to this. The relationship may be due to a direct effect of sodium intake on social interactions or through some third unmeasured variable. Neither of these possibilities gain support from the data collected for this study. Firstly, the direct effect of sodium intake causing changes in social interactions appears

unsustainable. The social sabotage scale is obtained through a frequency by evaluation, this evaluation being usually negative or zero. Therefore, a high frequency on this scale results in a large negative number after multiplication with the negative evaluation. The negative correlation of the social sabotage measure with the SIC indicates that the closer to zero (ie the further *right* on the number line) the greater the adherence to a low sodium diet. Under these circumstances, the suggestion of causality from sodium intake to social interactions would mean that the higher the sodium intake the more others sabotage attempts at sodium avoidance i.e. *not* eating a low sodium diet causes sabotage of a low sodium diet. This argument is strongly counter-intuitive and can be easily rejected.

Secondly the likelihood of the direction of causation being effected through some unmeasured variable can be at least partially rejected through a post hoc analysis of the data collected for this study. It may be that adherence to a low sodium diet leads people to expectation of sabotage/negative interactions, and that as this type of interaction is aversive such situations are avoided. Therefore a low sodium diet would 'cause' a low score on the social sabotage scale in that people would avoid such situations in order to not experience the unpleasant emotional consequence. The third variable would therefore be the range of distress experienced by respondents in these negative situations. Three evaluation items from the cognitive attitude measure arguably represent this dimension of distress caused by negative social interactions surrounding the adherence to a low sodium diet. These items were:

- For me, having friends put pressure on me to stop eating low sodium food is .....
- For me, having difficulty in dining out is .....
- For me, difficulty in providing acceptable food for visitors is ....

The sum of the responses to these three items had a very low non significant correlation with both sodium intake and social sabotage. Nor did this new variable affect the regression weights or R^2 when entered into the multiple regression shown in the results section.

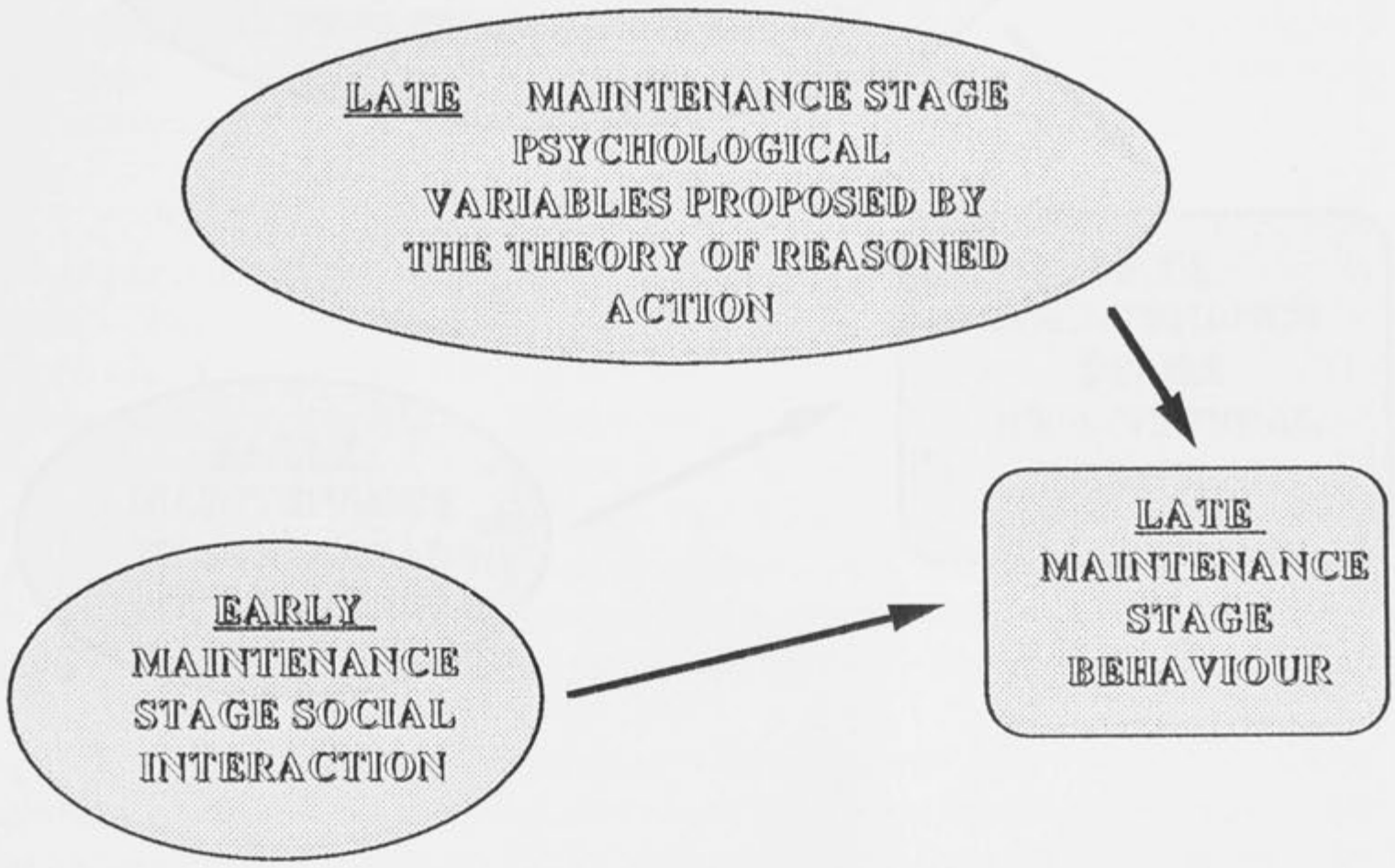
Taking both these points together, there would appear little reason to sustain the possibility that a low sodium diet caused the degree or type of social interaction experienced.

The main challenge to the Theory of Reasoned Action occurs through the relationship between specific social sabotage and sodium intake remaining significant even when the measurement of all independent variables and sodium intake occurred after the measurement of specific social sabotage - that is specific social sabotage at early maintenance providing a unique significant contribution to long-term maintenance of a low sodium diet over and above that made by the Theory of Reasoned Action variables measured during long term maintenance.

This finding supports the theoretical model proposed in Chapter Two and reproduced below. This model anticipated behavioural intention as being the most significant immediate predictor of behaviour (see Chapter Two, Figure 2.3). In the light

of the findings in Study Two, this figure is modified as appears below. In this figure the term 'behavioural intention' is replaced by 'psychological variables proposed by the Theory of Reasoned Action.

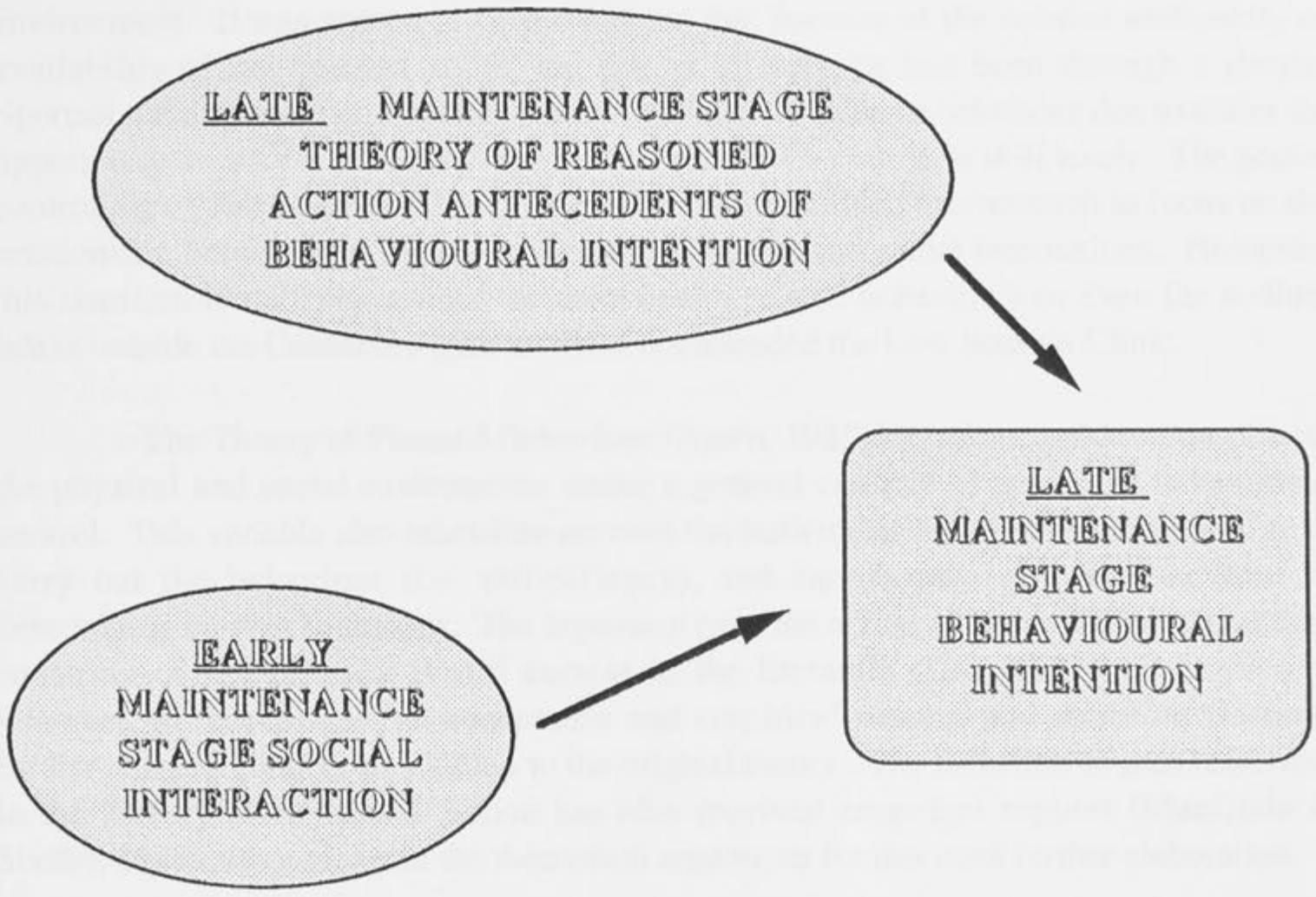
Figure 8-2: Restatement of Model Proposed in Figure 2-3



This difference from the original model in Chapter Two does not detract from the finding that specific social sabotage (the 'extraneous variable') contributes to behaviour in addition to the variables proposed by the Theory of Reasoned Action.

A further model including social interactions in the prediction of behavioural intention was also proposed in Chapter Two (figure 2.4). Even though behavioural intention did not achieve a significant weighting as a predictor of behaviour in Study Two Time Two, the test of the model was still carried out. The proposed model was supported by the data: specific social support at the early maintenance stage provided a unique significant contribution to the formation of behavioural intention held during long term maintenance. The contribution made by this early maintenance variable was over and above that of the other Theory of Reasoned Action variables measured during long term maintenance. The earlier figure is reproduced below.

Figure 8-3: Restatement of the Model Proposed in Figure 2-4



Therefore, the results obtained from the Study Two data support the theoretical challenges to the Theory of Reasoned action proposed in this thesis. Where there is a comparable level of specificity of measurement of all variables, social interactions contribute independently to the formation of both behavioural intention and behaviour.

The literature discussing the Theory of Reasoned Action fails to give a clear definition of the concept of 'volitional control'. This lack of clarity allows for the dismissal of any research as not a suitable test of the Theory by arguing that the target behaviour was involitional. At one level, this present research has anticipated this argument by choosing a behaviour which one of the authors of the Theory of Reasoned Action has defined as under volitional control (Ajzen, 1985). The results obtained in this study indicate that this is not the case as aspects of the social environment contribute independently to the performance of the behaviour. As suggested earlier in this Chapter it may be that health-related behaviour generally are not purely or even primarily under volitional control. Rather than this being a simple either/or situation the continuum proposed by Liska (1984) appears more likely. This continuum ranges from purely volitional through to purely environmental determinants of behaviour. It could be, therefore, that the opportunities for social sabotage are quite strong in the area of dietary sodium intake but that for other more personal health-related behaviours they are less significant - that is the determinants of other behaviours may be closer to the 'purely volitional' end of the continuum.

This research supports the addition of environmental considerations to the original formulation of the the Theory of Reasoned Action - at least in terms of the social environment. It was argued in Chapter Three that because of the relative uniformity of availability of low sodium goods and that as all subjects had been through a similar rigorous training program, that there would be little variation in behaviour due to either the opportunity to carry out the behaviour or as a result of variation in skill levels. The partial controlling of these two possible sources of variation enabled this research to focus on the relationship between the Theory of Reasoned Action and social interactions. However, this situation is unlikely to hold for most health related behaviours or even for sodium intake outside the Canberra region or those not attended the Low Sodium Clinic.

The Theory of Planned Behaviour (Ajzen, 1985) includes consideration of both the physical and social environment under a general variable of perceived behavioural control. This variable also takes into account the individuals belief in his or her ability to carry out the behaviour (i.e. self-efficacy), and significance of past behaviour in determining current behaviour. The argument over the actual existence of the theoretical construct of self-efficacy is still current in the literature (Lee, 1989). It continues, however, to receive general acceptance and empirical support and therefore warrants further consideration as an addition to the original theory. The inclusion of past behaviour in the Theory of Reasoned Action has also received empirical support (Manfredo & Shelby, 1988) although again the theoretical arguments for this need further elaboration.

Initially the Theory of Planned Behaviour would appear to be advocating the inclusion of one additional variable, that of perceived behavioural control. However as the preceding paragraph indicates this is really an umbrella term for a number of different variables. The problem to be addressed is the lack of specification of how these relatively discrete variables firstly differ on a theoretical level from those proposed by the Theory of Reasoned Action, and secondly, how they interact with the existing variables, and with each other. An investigation such as that employed in the present research enables an initial determination of the unique contribution of these variables. A more complex design incorporating three or more data points across time would be required to more clearly explore interactions and to further support the direction of causality.

8.3. The Role of Social Interaction in Producing Intentions and Actual Behaviour

8.3.1. General Social Support - The ISSB

At no point in the analysis did the measure of general social support achieve a significant beta weight in multiple regression onto behavioural intention. There is therefore no reason to suggest that the level of general social support has a direct effect on the formation of an intention regarding the maintenance of a low sodium diet.

The most interesting results from the analysis of general social support is the consistent negative direction of its relationship with the maintenance of a low sodium diet. While the beta for ISSB onto SIC achieved significance only in Time One of Study One, the direction of the relationships within the other cross sectional and longitudinal studies were consistent with this first study and, by and large, the reverse of the relationship found between the SIC and other variables. From these findings, it appears that general social support as measured by the ISSB directly *reduces* the maintenance of a low sodium diet irrespective of the individual attitude subjective norm or behavioural intention.

In an investigation of the relationship between occupational stress, social support and smoking cessation, Caplan, Cobb and French (1975) found that quitters had a lower level of social support than did those who continued smoking. In interpreting this direction of the relationship between social support and health-related behaviours, Westman, Eden and Shimrom (1985) suggest that the significant factors may be the extent to which the support group carried out or abstained from the behaviour in question. For example, general social support from a group of smokers may simply increase pressure to conform to group norms. The significant other for the subjects in this present research would normally be eating an average Australian sodium intake. Compared to the level aimed at for a 'low sodium' diet, this average level is very high. It may be possible, therefore, that a similar relationship holds between general social support and sodium intake as proposed by Westman et al. (1985) between support and smoking.

A citation search of the article by Caplan et al. (1975) failed to produce any similar findings of a negative relationship between general social support and health-related behaviour. Mermelstein et al. (1986) found a general support measure related to quitting smoking but not to maintenance. Similarly, O'Reilly and Thomas (1989) found no differences between those maintaining health-related behaviours in the level of general support asked for or expected. General social interactions of the kind measured by the ISSB could act to maintain the status quo by reducing the social pressure for change, and hence explain the direction of the relationship between general social interaction and sodium intake.

This finding is of particular significance to clinical intervention aimed at producing maintenance of change to health-related behaviour. Simply increasing the individual's 'network size' or 'satisfaction with support' without paying attention to the nature of the interactions experienced, may in fact result in a reduced likelihood of achieving the desired change.

This finding highlights the need to view social support as a multidimensional phenomenon, and adds weight to the opinion expressed by O'Reilly and Thomas (1989, p.256) that

> "... attempts to develop an instrument that will be generally accepted as a valid measure of social support for most studies may be an unattainable quest rather than a realistic goal."

This counter-intuitive finding that the greater the degree of general support the lower the adherence to a health-related behaviour, suggests that research in this area could

benefit from a narrowing of the focus of the social interaction, such as that employed in Study Two with the development of the Sodium-related Social Interaction Scale. Limiting this present research to use of a general measure of social support may have led to the erroneous conclusion that there was little effect of social interactions on maintenance of a health-related behaviour, and that the nature of this effect was to achieve a reduction in the desired behaviour. There are considerable implications which follow for clinical practice and community intervention programs from a finding such as this. For example, this result could be seen as indicating a need to focus only on the individuals targeted for behaviour change and that the behaviour of others was significant only insofar as it affected the subjective norm.

The need to identify the specific aspect of the broad range of social interactions which effect the maintenance of a health-related behaviour would appear to be a consequence of the specificity of the act. For example, a diabetic may score the SSIS as though he or she had a great deal of support and very little sabotage of his or her maintaining a low sodium diet. It would be surprising however, if these specific social interactions supported the maintenance of the person's *diabetic* diet.

The development of target specific social interaction measures would appear to be significant for both theoretical research and in the practice of effective health-related behaviour change. The following section further develops the implications of the results obtained from the SSIS.

8.3.2. Specific Social Support

The data from Study Two suggest that specific supportive social interactions significantly influence the behavioural intention to maintain a low sodium diet. However, only the specific social interactions early in the maintenance of the behaviour, that is at Time One, show this significant effect.

The nature of the relationship between specific supportive behaviours and intention at Time One is unclear. It would appear that this form of social support affects the formation of intention mainly through changing the affective response to performing the behaviour. However, one definite conclusion is that the level of specific social support experienced early in the maintenance of a low sodium diet affects the formation of behavioural intention later in the maintenance, and that this effect is independent of any of the Theory of Reasoned Action variables measured at this latter point of maintenance. However, the level of this social interaction variable, evidenced later in maintenance, seems to have no significant effect on the formation of behavioural intention after the behaviour has become firmly established, that is, at Time Two. Neither do specific socially supportive interactions significantly affect the actual performance of the behaviour of sodium intake over the other independent variables, either at Time One, Time Two, or between these points.

Unlike the level of general social support, it would appear of potential clinical significance to ensure the existence within the immediate social environment of behaviours specifically aimed at supporting the performance of the target health-related

behaviour. This type of interaction would appear likely to increase the individual's commitment to the maintenance of the desired behaviour and through that, the actual performance of the behaviour.

8.3.3. Specific Social Sabotage

The measurement and inclusion of specific social sabotage in a longitudinal test of the Theory of Reasoned Action resulted in a major contribution to the study of health-related behaviour change and maintenance.

The results of Study Two strongly support the thesis that the perceived level of social sabotage affects the adherence to a low sodium diet independently of the individual's attitude or intention. This effect was found in predicting contemporaneously measured behaviour and also behaviour measured up to eight months after the measurement of the level of social sabotage. Once the behaviour has become firmly established there was a reduction in the contribution of all contemporaneous social interactions to the performance of that behaviour. One exception to this general finding is the significant beta weight obtained by Time Two Specific Social Sabotage in predicting Time Two behavioural intention. Behavioural intention at Time Two Study Two, approached, but did not achieve, a significant beta weight. However, given the obvious significance of this variable within Study One Time Two, its importance as an antecedent of behaviour, even in this relatively long term maintenance stage, must be accepted and hence, indirectly, the importance of Specific Social Sabotage on behaviour.

As discussed earlier, this difference between the two studies may be due to differences in the initial motivation of the subjects involved. Hence any conclusion drawn from comparisons between the results of the two studies must be considered as tentative until more firmly established through further investigations.

The clinical implications of this independent significance of Specific Social Sabotage are considerable. It would appear, at least in those ostensibly committed to a particular behaviour change, that addressing the effects of actual and potential social sabotage on long term maintenance would be at least as important as ensuring and appropriate affective response, cognitive evaluation and behavioural intention. Additionally, this study has found that specific social sabotage is of greater significance to the maintenance of a low sodium diet than the level of either generalised social support or of social interaction supportive of the specific behaviour.

Owing to the scarcity of studies in this area, this research requires replication and generalisation to other behaviours before conclusions can be drawn as to the role of this phenomena in maintaining health-related behaviour. Given such replication there are a number of potentially significant areas of future research. A preliminary exploration is possible through post-hoc investigation of the data obtained in the current research. Two possibilities are briefly developed here to suggest the direction of this research.

Firstly, it would be useful to determine the significance of the individual's interpretation of the social sabotage versus the simple occurrence of a sabotaging event. This would allow for testing whether the variable is primarily cognitive or social in nature. The SSIS scores are arrived at by obtaining the product of a reported frequency of a social interaction and the respondent's evaluation of the significance of that behaviour. These scores, therefore, are intended to contain a component of cognitive interpretation of the effect of the social interaction, and as such do not constitute a 'clean' measure of frequency. Articles reviewed previously have shown that where social interactions are considered in behaviour change programs, the emphasis has been placed on altering the frequency of these interactions with little attention to the recipient's interpretation. Even where only self-reports of the simple occurrence of a social interaction is employed a major methodological difficulty arises. This problem is similar to that encountered within any self-report, that is, is the 'frequency' measure contaminated by the individual's evaluation of the event? For example, such evaluation may cause distortion at the level of perception, or in storage or retrieval of memory.

Given this methodological difficulty, a test of the cognitive versus the social nature of the social sabotage variable employed in this thesis would require, at best, an objective determination of the frequency of the specified social interactions, and at a minimum, the validation of a self report measure against some such external criterion of frequency. The SSIS, along with all other available measures of social interactions, does not allow for such a separation of social and cognitive factors. Therefore, the remains the possibility as discussed earlier, that the apparent significance of the social interaction component of this research is in fact the result of covariation with some uncontrolled 'third variable' -specifically a cognitive -evaluation dimension.

A second possible area for future research is that of further specifying the content of specific social interactions. The SSIS contains a number of items which exhibit a low frequency of response. this is particularly evident amongst the social sabotage items. Additionally, there is a large proportion of non-significant inter-item correlations. both these factors are proposed by Child (1979) as strongly advocating against the use of factor or principal components analysis. This argument, taken with that presented in the previous paragraph, can be interpreted as indicating that it is unproductive to consider further reduction of the phenomenon of social support over and above that proposed within this thesis. It was argued that this division of the SSIS into support and sabotage was justifiable on theoretical and clinical grounds and through the nature of item selection.

While it is questionable whether further subdivision of the content of behaviour specific social interactions would provide increased knowledge, it is possible that an investigation of the source of these interactions may do so. However, given the low reported frequency of the specific social interactions within this research, in particular the social sabotage items, it is likely that a more sensitive measure than the SSIS would be needed for such an analysis.

8.4. Implications for Behavioural Change Programs

Methods employed to effect change to and maintenance of health lifestyles range across a continuum from individual one to one programs through to large scale community education projects. The findings of the research presented in this thesis may be significant for all programs aimed at increasing health promoting behaviour.

As stated above the results of this investigation would require replication, in particular in relation to other behaviours, before strong conclusions can be drawn. However, the following suggestions appear worthy of further consideration in the development of health behaviour change programs at whatever point they occur in the continuum identified above.

Firstly, this research raises doubts as to the usefulness of employing analogue studies to determine the significance of psychosocial factors in clinical populations. It is proposed above that the difference between the results obtained within the two studies is caused by differences in the initial motivation for choosing to make the behaviour change. A clear sequele to this proposition is that a non-clinical sample may, if studied in isolation, provide findings which would be inappropriate if applied in a clinical setting.

Secondly, increasing the general level of social support experienced by an individual or within a community, may affect health either directly or through buffering of life stressors. However, this general social support often incorporates a component of belonging to a group and/or acceptance of the person 'just the way they are'. Given this, any use of general social support as an aid to increasing adherence to a healthy lifestyle should ensure that this social support does not just simply help to maintain the status quo and therefore reduce any pressure on the individual to change their unhealthy behaviours.

Thirdly, others' activities supportive of the change to a health-promoting behaviour appear to be important in forming and maintaining a commitment to carrying out the behaviour. There is no evidence from this research that this variable directly effects the actual performance of the behaviour. It would appear that other factors such as affective response or intention must be considered when determining the effect of specific social support on the performance of a health-related behaviour.

A fourth general point to note is that the further away from the point of change the less significant, in terms of the target behaviour, the consequences of any social interactions becomes. At this late maintenance stage the comparative importance of behavioural intention diminishes as that of attitude increases. Therefore, it may be better for any follow-up contact in an intervention aimed at maintenance of a health-related behaviour to focus on attitudinal factors rather than social interactions.

Finally, the degree to which others wittingly or unwittingly sabotage the performance of the health-related behaviour during the acquisition and early maintenance stage directly affects the performance of the behaviour, irrespective of the attitude, subjective norm or intention. The results from Study Two suggest that this relationship

may be of considerable importance to long term maintenance. This effect is possibly at least as great as the individual contributions of the other psychological variables. This independent effect of early maintenance social sabotage may help to explain the poor adherence to a health-related behaviour change even in those who profess a strong intention to maintain this change. As most behaviour change interventions are of short duration and focus on the change and short-term maintenance stage, it is possible that more emphasis on the social environment at this stage may produce greater long term maintenance. Whether this effect is due to the individual's cognitive interpretation of the social interaction or a *direct* effect on behaviour of the behaviour of significant others' is beyond the scope of the present research.

In conclusion, this research has provided both a successful challenge to the Theory of Reasoned Action and an investigation of the interaction of the social environment with psychological variables as determinants of a specific health-related behaviour. A number of methodological problems have been encountered in this research. These include: obtaining a measure of affect which is not simply evaluative in nature; distinguishing between the cognitive-evaluative aspect of social interactions and their actual existence as independent social phenomena; establishing the direction of causality between individual behaviour and the social environment; the difficulty of generalising from a specific behaviour within a clinical population to general health-related behaviours within a general population; the need for a strong theoretical basis for the inclusion of additional variables within any model, rather than relying on a simple extrapolation from limited data.

Any future investigations, such as that leading from the speculations provided in Appendix I, requires the consideration of these problems in the determination of a more theoretically rigorous and methodologically sound research design.

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Appendix A

QUESTIONNAIRE GENERATING INITIAL ITEM POOL FOR THE THEORY OF REASONED ACTION QUESTIONNAIRES

BELIEFS AND ATTITUDE TO LOW SALT INTAKE

Please write down as many different answers to each question as you can.
There are no right or wrong answers.
The aim of this questionnaire is to find out what is involved in making a decision to reduce salt intake.

(1). What are the advantages of a greatly reduced salt intake?

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....
9. .....

(2). What are the disadvantages of a greatly reduced salt intake?

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....
9. .....

(3).Is there anything else you associate with a low salt intake?

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....
9. .....

(4). Are there any groups or people who would approve of you staying on a greatly reduced salt intake?

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....
9. .....

(5). Are there any groups or people who would disapprove of you staying on a greatly reduced salt intake?

1. .....
2. .....
3. .....
4. .....
5. .....

6. .....

7. .....

8. .....

9. .....

(6). Are there any other groups or people who come to mind when you consider staying on a greatly reduced salt intake?

1. .....

2. .....

3. .....

4. .....

5. .....

6. .....

7. .....

8. .....

9. .....

Appendix B

THEORY OF REASONED ACTION QUESTIONNAIRE FROM STUDY ONE

FACTORS AFFECTING SODIUM INTAKE

PLEASE READ THESE INSTRUCTIONS CAREFULLY

This questionnaire is designed to look at how your beliefs and those of people around you affect the likelihood of your staying on a low sodium diet.

There are no right or wrong answers to these questions, but it is important that you answer as truthfully and accurately as you can.

Place an 'x' over the word which most closely agrees with how you feel about each statement.

Example

Regular medical checks reduce the risk of serious illness

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

If for example you think it is quite likely that regular medical checks reduce the risk of serious illness, you would place your 'x' as follows:

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

Some of the scales have different end points, for example good - bad. You should interpret these scales in a similar way.

For me watching television is

good _____:_____:_____:_____:_____:_____:_____ *bad*

extremely quite slightly neither slightly quite extremely

If for example you feel that for you, watching television is slightly bad, you would place your 'x' as follows:

good _____:_____:_____:_____:_____:_____:_____ *bad*

extremely quite slightly neither slightly quite extremely

Please be sure to answer all these items and not to place more than one 'x' on a single scale.

NAME: .....

ADDRESS: .....

.....

PHONE NO: Home: .....

Work: .....

I am willing to be contacted for the collection of follow up information

by phone: Yes No

by mail: Yes No

1. Over the next six months I intend to maintain a low sodium diet.

probable _____:_____:_____:_____:_____:_____:_____ *improbable*

extremely quite slightly neither slightly quite extremely

2. Over the next six months I intend to eat food with sodium added in cooking or at the table.

probable _____:_____:_____:_____:_____:_____:_____ *improbable*

extremely quite slightly neither slightly quite extremely

3. Over the next six months I intend to eat food with sodium added in the manufacturing process

probable _____:_____:_____:_____:_____:_____:_____ *improbable*

extremely quite slightly neither slightly quite extremely

4. For me, maintaining a low sodium diet for the next six months would be

difficult _____:_____:_____:_____:_____:_____:_____ *easy*

pleasant _____:_____:_____:_____:_____:_____:_____ *unpleasant*

harmful _____:_____:_____:_____:_____:_____:_____ *beneficial*

good _____:_____:_____:_____:_____:_____:_____ *bad*

extremely quite slightly neither slightly quite extremely

5. Eating low sodium food will reduce high blood pressure

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

6. Eating low sodium food causes difficulty in dining out

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

7. Eating low sodium food results in an increased appreciation of the flavour of food

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

8. Eating low sodium food means taking more time in food preparation

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

9. Eating low sodium food will prevent high blood pressure.

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

10. Eating low sodium food results in reduced medication for high blood pressure

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

11. Eating low sodium food reduces the risk of heart attack, stroke or other medical problems

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

12. Eating low sodium food results in higher food cost

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

13. Eating low sodium food makes it hard to provide acceptable food for visitors

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

14. Eating low sodium food is boring

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

15. Eating low sodium foods improves ones awareness and interest in food

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

16. Eating low sodium food means friends will put pressure on me to stop

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

17. For me, reducing high blood pressure is

good _____:_____:_____:_____:_____:_____:_____ *bad*

extremely quite slightly neither slightly quite extremely

18. For me, difficulty in dining out is

good _____:_____:_____:_____:_____:_____:_____ *bad*

extremely quite slightly neither slightly quite extremely

19. For me, an increased appreciation of the flavour of food is

good _____:_____:_____:_____:_____:_____:_____ *bad*

extremely quite slightly neither slightly quite extremely

20. For me taking more time in food preparation is

good _____:_____:_____:_____:_____:_____:_____ *bad*

extremely quite slightly neither slightly quite extremely

21. For me, preventing high blood pressure is

good _____:_____:_____:_____:_____:_____:_____ *bad*

extremely quite slightly neither slightly quite extremely

22. For me, reducing medication for high blood pressure is

good _____:_____:_____:_____:_____:_____:_____ *bad*

extremely quite slightly neither slightly quite extremely

23. For me, reducing the risk of heart attack, stroke or other medical problems is

good _____:_____:_____:_____:_____:_____:_____ *bad*

extremely quite slightly neither slightly quite extremely

24. For me, higher food cost is

good _____:_____:_____:_____:_____:_____:_____ *bad*

extremely quite slightly neither slightly quite extremely

25. For me, difficulty in providing acceptable food for visitors is

good _____:_____:_____:_____:_____:_____:_____ *bad*

extremely quite slightly neither slightly quite extremely

26. For me, eating boring food is

good _____:_____:_____:_____:_____:_____:_____ *bad*

extremely quite slightly neither slightly quite extremely

27. For me, an improved awareness and interest in food is

good _____:_____:_____:_____:_____:_____:_____ *bad*

extremely quite slightly neither slightly quite extremely

28. For me, having friends put pressure on me to stop eating low sodium food is

good _____:_____:_____:_____:_____:_____:_____ *bad*

extremely quite slightly neither slightly quite extremely

29. My doctor thinks I should eat low sodium food

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

30. My spouse thinks I should eat low sodium food

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

31. People interested in health think I should eat low sodium food

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

32. My family thinks I should eat low sodium food

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

33. Organisations interested in health (for example the National Heart Foundation or my insurance company) think I should eat low sodium food

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

34. People who usually disagree with me think I should eat low sodium food

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

35. Food manufacturers think I should eat low sodium food

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

36. My friends think I should eat low sodium food

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

37. Most people who are important to me think I should eat low sodium food

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

38. Generally speaking, I want to do what my doctor thinks I should do

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

39. Generally speaking, I want to do what my spouse thinks I should do

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

40. Generally speaking, I want to do what people interested in health think I should do

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

41. Generally speaking, I want to do what my family thinks I should do

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

42. Generally speaking, I want to do what organisations interested in health (for example the National Heart Foundation or my insurance company) think I should do

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

43. Generally speaking, I want to do what people who usually disagree with me think I should do

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

44. Generally speaking, I want to do what food manufactures think I should do

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

45. Generally speaking, I want to do what my friends think I should do

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

46. Generally speaking, I want to do what most people who are important to me think I should do

likely _____:_____:_____:_____:_____:_____:_____ *unlikely*

extremely quite slightly neither slightly quite extremely

Thank you for your cooperation.

If you have indicated your willingness to be recontacted, this will happen in about six months from now.

Appendix C

THE INVENTORY OF SOCIALLY SUPPORTIVE BEHAVIOURS

SOCIAL SUPPORT INVENTORY

INSTRUCTIONS

We are interested in learning about some of the ways that you feel people have helped you or tried to make life more pleasant for you over the past four weeks. Below you will find a list of activities that other people might have done for you, to you, or with you in recent weeks. Please read each item carefully and indicate how often these activities happened to you during the past four weeks.

Use the following scale to make your ratings:

not at all	*once or twice*	*about once a week*	*several times a week*	*about every day*

If, for example, the item:

45. Gave you a ride to the doctor

happened once or twice during the past four weeks, you would make your rating like this:

	X			
not at all	*once or twice*	*about once a week*	*several times a week*	*about every day*

Please read each item carefully and select the rating that you think is the most accurate.

During the past four weeks, how often did other people do these activities for you, to you, or with you:

1. Looked after a family member when you were away

not at all	once or twice	about once a week	several times a week	about every day

2. Was right there with you (physically) in a stressful situation

not at all	once or twice	about once a week	several times a week	about every day

3. Provided you with a place where you could get away for a while

not at all	once or twice	about once a week	several times a week	about every day

4. Watched after your possessions when you were away (pets, plants, home, apartment, etc.)

not at all	once or twice	about once a week	several times a week	about every day

5. Told you what she/he did in a situation similar to yours

not at all	once or twice	about once a week	several times a week	about every day

6. Did some activity together to help you get your mind off of things

not at all	once or twice	about once a week	several times a week	about every day

7. Talked with you about some interests of yours

not at all	once or twice	about once a week	several times a week	about every day

8. Let you know that you did something well

not at all	once or twice	about once a week	several times a week	about every day

9. Went with you to someone who could take action

not at all	once or twice	about once a week	several times a week	about every day

10. Told you that you are OK just the way you are

not at all	once or twice	about once a week	several times a week	about every day

11. Told you that she/he would keep the things that you talk about private -- just between the two of you

not at all	once or twice	about once a week	several times a week	about every day

12. Assisted in you setting a goal for yourself

not at all	once or twice	about once a week	several times a week	about every day

13. Made it clear what was expected of you

not at all	once or twice	about once a week	several times a week	about every day

14. Expressed esteem or respect for a competency or personal quality of yours

not at all	once or twice	about once a week	several times a week	about every day

15. Gave you some information on how to do something

not at all	once or twice	about once a week	several times a week	about every day

16. Suggested some action that you should take

not at all	once or twice	about once a week	several times a week	about every day

17. Gave you over $25

not at all	once or twice	about once a week	several times a week	about every day

18. Comforted you by showing you some physical affection

not at all	once or twice	about once a week	several times a week	about every day

19. Gave you some information to help you understand a situation you were in

not at all	once or twice	about once a week	several times a week	about every day

20. Provided you with some transportation

not at all	once or twice	about once a week	several times a week	about every day

21. Checked back with you to see if you followed the advice you were given

not at all	once or twice	about once a week	several times a week	about every day

22. Gave you under $25

not at all	once or twice	about once a week	several times a week	about every day

23. Helped you understand why you didn't do something well

not at all	once or twice	about once a week	several times a week	about every day

24. Listened to you talk about your private feelings

not at all	once or twice	about once a week	several times a week	about every day

25. Loaned or gave you something (a physical object other than money) that you needed

not at all	once or twice	about once a week	several times a week	about every day

26. Agreed that what you wanted to do was right

not at all	once or twice	about once a week	several times a week	about every day

27. Said things that made your situation clearer and easier to understand

not at all	once or twice	about once a week	several times a week	about every day

28. Told you how he/she felt in a situation that was similar to yours

not at all	once or twice	about once a week	several times a week	about every day

29. Let you know that he/she will always be around if you need assistance

not at all	once or twice	about once a week	several times a week	about every day

30. Expressed interest and concern in your well-being

not at all	once or twice	about once a week	several times a week	about every day

31. Told you that she/he feels very close to you

not at all	once or twice	about once a week	several times a week	about every day

32. Told you who you should see for assistance

not at all	once or twice	about once a week	several times a week	about every day

33. Told you what to expect in a situation that was about to happen

not at all	once or twice	about once a week	several times a week	about every day

34. Loaned you over $25

not at all	once or twice	about once a week	several times a week	about every day

35. Taught you how to do something

not at all	once or twice	about once a week	several times a week	about every day

36. Gave you feedback on how you were doing without saying it was good or bad

not at all	*once or twice*	*about once a week*	*several times a week*	*about every day*

37. Joked and kidded to try to cheer you up

not at all	*once or twice*	*about once a week*	*several times a week*	*about every day*

38. Provided you with a place to stay

not at all	*once or twice*	*about once a week*	*several times a week*	*about every day*

39. Pitched in to help you do something that needed to get done

not at all	*once or twice*	*about once a week*	*several times a week*	*about every day*

40. Loaned you under $25

not at all	*once or twice*	*about once a week*	*several times a week*	*about every day*

Appendix D

THE SODIUM INTAKE CHECKLIST

ID NUMBER _____ FORM NUMBER _____

DATE COMPLETED _____ TOTAL SCORE _____

Please circle the number of times you have eaten the following foods **IN THE PAST THREE DAYS**, not counting today.
It is important that you fill in the questionnaire as accurately as possible, indicating every time you have eaten **any** of the foods mentioned.

1.	Food with salt added in cooking.	0	1	2	3	4	5	6	7	8 or more
2.	Food with salt added at the table.	0	1	2	3	4	5	6	7	8 or more
3.	Cured meats such as ham, bacon, sausages or luncheon meats.	0	1	2	3	4	5	6	7	8 or more
4.	Corned/canned meats, salami, meat pastes.	0	1	2	3	4	5	6	7	8 or more
5.	Pies, pasties or sausage rolls.	0	1	2	3	4	5	6	7	8 or more
6.	Smoked or canned fish, fish-pastes (salted).	0	1	2	3	4	5	6	7	8 or more
7.	Mature cheese (other than unsalted).	0	1	2	3	4	5	6	7	8 or more
8.	Processed cheese, cheese spreads	0	1	2	3	4	5	6	7	8 or more
9.	Yeast vegetable extract such as vegemite promite or marmite	0	1	2	3	4	5	6	7	8 or more
10.	Olives, salted nuts, crackers, potato crisps.	0	1	2	3	4	5	6	7	8 or more
11.	Canned vegetables, canned soups (other than unsalted).	0	1	2	3	4	5	6	7	8 or more
12.	Packet soups, beef/chicken cubes.	0	1	2	3	4	5	6	7	8 or more

13. Dressings, sauces, pickles.	0	1	2	3	4	5	6	7	8 or more
14. Ordinary (salted) bread.	0	1	2	3	4	5	6	7	8 or more
15. Ordinary (salted) breakfast cereals.	0	1	2	3	4	5	6	7	8 or more
16. Cakes, pastries, biscuits (other than low sodium/salt).	0	1	2	3	4	5	6	7	8 or more
17. Ordinary (salted) butter or margarine.	0	1	2	3	4	5	6	7	8 or more
18. Chocolate or confectioneries (salted).	0	1	2	3	4	5	6	7	8 or more
19. More than 300ml (half pint) of milk.	0	1	2	3	4	5	6	7	8 or more
20. Pharmaceutical goods containing sodium, for example, soluble pain killers, effervescent vitamins and minerals, some health drinks, indigestion remedies and laxatives.	0	1	2	3	4	5	6	7	8 or more
21. Any food containing sodium not mentioned above.	0	1	2	3	4	5	6	7	8 or more

Compared to my normal diet over the past month, the amount of salted food (any of the above) I have eaten in the past three days has been:

much more a little more about the same a little less much less

Appendix E

QUESTIONNAIRE GENERATING THE INITIAL ITEMS FOR THE SODIUM-RELATED SOCIAL INTERACTION SCALE

SODIUM INTAKE AND SOCIAL INTERACTIONS

Please indicate how helpful you consider each of the following factors in maintaining a low sodium diet.

Over the past four weeks someone has:

1. Indicated they agreed with my staying on a low sodium diet.

1	2	3	4	5	6	7
extremely helpful	*quite helpful*	*helpful*	*neither*	*unhelpful*	*quite unhelpful*	*extremely unhelpful*

2. When dining out, chose for us a restaurant which sells only salted food.

1 2 3 4 5 6 7

3. Told me about the availability of a low sodium food.

1 2 3 4 5 6 7

4. Told me they thought I should eat food containing sodium, the same as everyone else.

1 2 3 4 5 6 7

5. Provided low sodium manufactured goods for me to eat.

1 2 3 4 5 6 7

6. Told me about the availability of food containing sodium.

1 2 3 4 5 6 7

7. Told me they thought I should continue on a low sodium diet.

1 2 3 4 5 6 7

8. Refused to eat low sodium food I have prepared.

1 2 3 4 5 6 7

9. Given me information on how to prepare a low sodium meal.

1 2 3 4 5 6 7

10. Told me they thought less of me for staying on a low sodium diet.

1 2 3 4 5 6 7

11. Cooked low sodium food for me to eat.

1 2 3 4 5 6 7

12. Indicated that my desire to eat low sodium food did not cause them any inconvenience.

1 2 3 4 5 6 7

13. Indicated that they disagreed with my staying on a low sodium diet.

1 2 3 4 5 6 7

14. Told me how they had managed to refuse food containing sodium.

1 2 3 4 5 6 7

15. Cooked only food containing sodium for me to eat.

1	2	3	4	5	6	7
extremely helpful	*quite helpful*	*helpful*	*neither*	*unhelpful*	*quite unhelpful*	*extremely unhelpful*

16. Eaten low sodium food which I have prepared.

1 2 3 4 5 6 7

17. Provided only manufactured goods containing sodium for me to eat.

1 2 3 4 5 6 7

18. Given me information on how to prepare a meal which contained sodium.

1 2 3 4 5 6 7

19. Told me they admired me for staying on a low sodium diet.

1 2 3 4 5 6 7

20. Indicated that my desire to eat low sodium food causes them inconvenience.

1 2 3 4 5 6 7

21. When dining out, chose for us a restaurant which sells unsalted food.

1 2 3 4 5 6 7

22. Complained about low sodium food which I have prepared.

1 2 3 4 5 6 7

23. Told me they enjoyed the taste of low sodium food.

1	2	3	4	5	6	7
extremely helpful	*quite helpful*	*helpful*	*neither*	*unhelpful*	*quite unhelpful*	*extremely unhelpful*

24. Told me that they didn't know of anyone but me who was on a low sodium diet.

1 2 3 4 5 6 7

25. Made a point of <u>not</u> offering food containing sodium to me.

1 2 3 4 5 6 7

26. Complained about having to prepare low sodium food for me.

1 2 3 4 5 6 7

27. Did not allow for my desire to eat low sodium food when planning a group activity.

1 2 3 4 5 6 7

28. Told me how they had not been able to refuse food containing sodium.

1 2 3 4 5 6 7

29. Defended me against criticism of my low sodium diet.

1 2 3 4 5 6 7

30. Would not explain to somebody else that I wanted to eat low sodium food.

1 2 3 4 5 6 7

31. Gave me information which suggested that a low sodium diet <u>was</u> important for good health.

1	2	3	4	5	6	7
extremely helpful	*quite helpful*	*helpful*	*neither*	*unhelpful*	*quite unhelpful*	*extremely unhelpful*

32. Complimented me on low sodium food which I had prepared.

1 2 3 4 5 6 7

33. Made a point of offering food containing sodium to me.

1 2 3 4 5 6 7

34. Told me they considered eating low sodium food to be important.

1 2 3 4 5 6 7

35. Told me of people who they considered important or admired who opposed low sodium diet.

1 2 3 4 5 6 7

36. Told me that they thought the low sodium diet was doing me some good.

1 2 3 4 5 6 7

37. Allowed for my desire to eat low sodium food when planning a group activity.

1 2 3 4 5 6 7

38. Publicly criticised me for staying on a low sodium diet.

1 2 3 4 5 6 7

39. Explained to somebody else that I wanted to eat low sodium food.

1	2	3	4	5	6	7
extremely helpful	*quite helpful*	*helpful*	*neither*	*unhelpful*	*quite unhelpful*	*extremely unhelpful*

40. Did not let me know of a forthcoming event so that I would be able to provide low sodium food for myself.

1 2 3 4 5 6 7

41. Let me know they didn't mind preparing low sodium food for me.

1 2 3 4 5 6 7

42. Disagreed with paying the increased cost incurred in eating low sodium food.

1 2 3 4 5 6 7

43. Told me they knew of other people who were on a low sodium diet.

1 2 3 4 5 6 7

44. Told me they thought the low sodium diet was doing me some harm.

1 2 3 4 5 6 7

45. Told me of some other people who they considered important or admired who advocated a low sodium diet.

1 2 3 4 5 6 7

46. Told me they did not enjoy the taste of low sodium foods.

1 2 3 4 5 6 7

47. Let me know of a forthcoming event so that I would be able to provide low sodium food for myself.

1	2	3	4	5	6	7
extremely helpful	*quite helpful*	*helpful*	*neither*	*unhelpful*	*quite unhelpful*	*extremely unhelpful*

48. Told me they considered eating low sodium food to be unimportant.

1 2 3 4 5 6 7

49. Publicly praised me for staying on a low sodium diet.

1 2 3 4 5 6 7

50. Agreed with criticism of my low sodium diet.

1 2 3 4 5 6 7

51. Agreed with paying the increased cost incurred in eating low sodium food.

1 2 3 4 5 6 7

52. Gave me information which suggested that a low sodium diet was not important for good health.

1 2 3 4 5 6 7

Appendix F

INSTRUCTIONS FOR COMPLETING THE SODIUM-RELATED SOCIAL INTERACTION SCALE

HEALTH RELATED SOCIAL INTERACTION SCALE - SODIUM

INSTRUCTIONS AND EXAMPLES

There is strong evidence to suggest that the kinds of interactions we have with people around us help or hinder our attempts to maintain a healthy way of life.

The purpose of this questionnaire is to discover which interactions are important for people who wish to maintain a low sodium diet.

You are given the opportunity to assess various social interactions that you may have experienced over the past four weeks. You are asked to say who was involved (just first name initial will do), how often this person carried out the particular behaviour, and how unhelpful or helpful you found it for maintaining your low sodium diet.

Example: This is what the recording sheet looks like, read on for an explanation of how to use it.

Told me they did not enjoy the taste of low sodium food.

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

For example, if you are married and your husband or wife had carried out this behaviour in the past four weeks, you should place the initial of his or her first name on the line under the heading SPOUSE and next to the word Initial, like this:

Told me they did not enjoy the taste of low sodium food.

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	J			
Number of Times				
Unhelpful to Helpful				

On the next line down you should indicate the number of times your spouse carried out this behaviour in the past four weeks. To do this please use the following scale.

1	2	3	4	5
once only	two or three times	about once a week	two or three times a week	about once a day

So if this behaviour had occurred "two or three times" your answer should look like this:

Told me they did not enjoy the taste of low sodium food.

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	J			
Number of Times	2			
Unhelpful to Helpful				

To fill in the next line, look below at the scale of numbers from one to seven. You will notice that each number is linked to a degree of unhelpfulness or helpfulness. You should pick the number which best indicates how unhelpful or helpful this behaviour was in maintaining your low sodium diet.

1	2	3	4	5	6	7
unhelpful	*quite unhelpful*	*slightly unhelpful*	*neither*	*slightly helpful*	*quite helpful*	*helpful*

For example, let us assume you found the interaction '*slightly unhelpful*'. Your answer should look like this:

Told me they did not enjoy the taste of low sodium food.

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	J			
Number of Times	2			
Unhelpful to Helpful	3			

Now, if as well as your spouse, a member of your family (say Brian) had carried out this behaviour "about once a day" and you had found this "unhelpful" (on the scale this is linked to number '1'), your answer should look like this:

Told me they did not enjoy the taste of low sodium food.

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	J	B	___	___
Number of Times	2	4	___	___
Unhelpful to Helpful	3	1	___	___

You will notice that there are two more spaces for you to report on other family members.

The next step is to give the same information about interactions with people encountered in a social setting - i.e. during recreation and leisure times.

And finally, the last column allows you to provide the same information about interactions occurring with people at work or during your daily activities.

You will find an example question on the first page of the answer booklet. To make sure you understand the instructions, please fill out this example as if a social acquaintance of yours - Mary - had carried out the behaviour on 2 occasions and you found it '*helpful*'.

Suppose also that someone whom you meet in your daily work - John - had carried out the behaviour on 3 occasions and you found it '*slightly helpful*'.

Appendix G

THE SODIUM-RELATED SOCIAL INTERACTION SCALE

THIS SCALE WAS PRESENTED IN BOOKLET FORM

NAME: _____

NUMBER: ☐ ☐ ☐ ☐

HEALTH RELATED SOCIAL INTERACTION SCALE - SODIUM

Answer booklet only - instructions on separate information sheets.

Example Question:

Explained to somebody that I wanted to eat low sodium food.

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

Please indicate each time a behaviour has occurred only in the past four weeks, whether you consider it related to your low sodium diet or not. If you leave a question unanswered it will indicate that the behaviour has not occurred at all during this time.

Remember, you are not asked if the behaviour would be generally unhelpful/helpful, but rather how each occurrence affected your staying on a low sodium diet.

1. *Indicated they agreed with my staying on a low sodium diet.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

2. *When dining out chose for me a restaurant which sold only <u>salted</u> food.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

3. *Told me about the availability of a low sodium food.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

4. *Told me they thought I should eat food containing sodium the same as everyone else.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

5. *Provided low sodium manufactured goods for me to eat.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

6. *Told me they thought I should continue on a low sodium diet.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

7. *Refused to eat low sodium food I had prepared.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

8. *Gave me information on how to prepare a low sodium meal.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

9. *Told me they thought less of me for staying on a low sodium diet.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

10. *Cooked low sodium food for me to eat.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

11. *Indicated that my choice of low sodium food <u>did not</u> cause them any inconvenience.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

12. *Indicated that they disagreed with my staying on a low sodium diet.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

13. *Told me how they had managed to refuse food containing sodium.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

14. *Cooked only food containing sodium for me to eat.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

15. *Ate low sodium food which I had prepared.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

16. *Provided only manufactured goods containing sodium for me to eat.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

17. *Gave me information on how to prepare a meal which contained sodium.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

18. *Told me they admired me for staying on a low sodium diet.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

19. *Indicated that my choice of low sodium food caused them inconvenience.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

20. *When dining out, chose for me a restaurant which sold <u>unsalted</u> food.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

21. *Complained about low sodium food which I had prepared.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

22. *Told me they enjoyed the taste of low sodium food.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

23. *Told me they didn't know of anyone but me who was on a low sodium diet.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

24. *Made a point of not offering food containing sodium to me.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

25. *Complained about having to prepare low sodium food for me.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

26. *Did not allow for my low sodium diet when planning a group activity.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

27. *Defended me against criticism of my low sodium diet.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

28. *Gave me information which suggested that a low sodium diet was important for good health.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

29. *Complimented me on low sodium food which I had prepared.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

30. *Made a point of offering food containing sodium to me.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

31. *Told me they considered eating low sodium food to be important.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

32. *Told me they thought the low sodium diet was doing me some good.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

33. *Allowed for my low sodium diet when planning a group activity.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

34. *Publicly criticised me for staying on a low sodium diet.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

35. *Did <u>not</u> let me know of a forthcoming event so that I would be able to provide low sodium food for myself.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

36. *Let me know they didn't mind preparing low sodium food for me.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

37. *Disagreed with paying the increased cost incurred in eating low sodium food.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

38. *Told me they thought the low sodium diet was doing me some harm.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

39. *Let me know of a forthcoming event so that I would be able to provide low sodium food for myself.*

	SPOUSE	FAMILY	PEOPLE IN A SOCIAL SETTING	PEOPLE AT WORK OR DAILY ACTIVITY
Initial	___	___ ___ ___	___ ___ ___	___ ___ ___
Number of Times	___	___ ___ ___	___ ___ ___	___ ___ ___
Unhelpful to Helpful	___	___ ___ ___	___ ___ ___	___ ___ ___

Appendix H

THEORY OF REASONED ACTION QUESTIONNAIRE FROM STUDY TWO

LOW SODIUM CLINIC
WODEN VALLEY HOSPITAL

Questionnaire One

Patient Number

— — — —

NAME: .....

ADDRESS: .....

.....

PHONE NO: Home: .....

Work: .....

I am willing to be contacted for the collection of follow up information:

Yes

No

PLEASE READ THESE INSTRUCTIONS

This questionnaire is designed to look at how your beliefs and those of people around you affect the likelihood of your staying on a low sodium diet.

There are no right or wrong answers to these questions, so please indicate what you believe is true for yourself.

Please circle the number on the scale which most closely agrees with how you feel about each statement.

Please do not simply circle the end points on each scale but try to indicate the degree to which you hold the opinion.

Example Only

Regular medical checks reduce the risk of serious illness.

very definitely — 1 : 2 : 3 : 4 : 5 : 6 : 7 — not at all

- likely - somewhat - unlikely -

1. Eating low sodium food means going without my favourite foods.

very definitely — 1 : 2 : 3 : 4 : 5 : 6 : 7 — not at all

(1 – 2 likely – 3 – 4 sometimes – 5 – 6 unlikely – 7)

2. Eating low sodium food results in better health.

very definitely — 1 : 2 : 3 : 4 : 5 : 6 : 7 — not at all

(1 – 2 likely – 3 – 4 somewhat – 5 – 6 unlikely – 7)

3. Eating low sodium food results in higher food cost.

very definitely — 1 : 2 : 3 : 4 : 5 : 6 : 7 — not at all

(1 – 2 likely – 3 – 4 sometimes – 5 – 6 unlikely – 7)

4. Eating low sodium food will reduce high blood pressure.

very definitely — 1 : 2 : 3 : 4 : 5 : 6 : 7 — not at all

(1 – 2 likely – 3 – 4 somewhat – 5 – 6 unlikely – 7)

5. Eating low sodium food makes it hard to provide acceptable food for visitors.

very definitely — 1 : 2 : 3 : 4 : 5 : 6 : 7 — not at all

(1 – 2 likely – 3 – 4 sometimes – 5 – 6 unlikely – 7)

6. Eating low sodium food is boring.

very definitely — 1 : 2 : 3 : 4 : 5 : 6 : 7 — not at all

(1 – 2 likely – 3 – 4 sometimes – 5 – 6 unlikely – 7)

7. Eating low sodium food improves ones awareness and interest in food.

very definitely — 1 : 2 : 3 : 4 : 5 : 6 : 7 — not at all

(1 – 2 likely – 3 – 4 somewhat – 5 – 6 unlikely – 7)

8. Eating low sodium food results in reduced fluid retention in the body.

very definitely — 1 : 2 : 3 : 4 : 5 : 6 : 7 — not at all

(1 – 2 likely – 3 – 4 somewhat – 5 – 6 unlikely – 7)

9. Eating low sodium food causes difficulty in dining out.

very definitely — 1 : 2 : 3 : 4 : 5 : 6 : 7 — not at all

(1 – 2 likely – 3 – 4 sometimes – 5 – 6 unlikely – 7)

10. Eating low sodium food results in an increased appreciation of the flavour of food.

very definitely 1 : 2 : 3 : 4 : 5 : 6 : 7 not at all
- likely - somewhat - unlikely -

11. Eating low sodium food means taking more time in food preparation.

very definitely 1 : 2 : 3 : 4 : 5 : 6 : 7 not at all
- likely - sometimes - unlikely -

12. Eating low sodium food means eating healthier food.

very definitely 1 : 2 : 3 : 4 : 5 : 6 : 7 not at all
- likely - somewhat - unlikely -

13. Eating low sodium food results in reduced mecication for high blood pressure.

very definitely 1 : 2 : 3 : 4 : 5 : 6 : 7 not at all
- likely - somewhat - unlikely -

14. Eating low sodium food results in an increased sense of well being.

very definitely 1 : 2 : 3 : 4 : 5 : 6 : 7 not at all
- likely - somewhat - unlikely -

15. Eating low sodium food reduces the risk of heart attack, stroke or other medical problems.

very definitely 1 : 2 : 3 : 4 : 5 : 6 : 7 not at all
- likely - somewhat - unlikely -

16. Eating low sodium food means friends will put pressure on me to stop.

very definitely 1 : 2 : 3 : 4 : 5 : 6 : 7 not at all
- likely - somewhat - unlikely -

17. Eating low sodium food will prevent high blood pressure.

very definitely 1 : 2 : 3 : 4 : 5 : 6 : 7 not at all
- likely - somewhat - unlikely -

* * *

1. For me, going without my favourite foods is

good	1	: 2	: 3	: 4	: 5	: 6	: 7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

2. For me, having better health is

good	1	: 2	: 3	: 4	: 5	: 6	: 7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

3. For me, higher food cost is

good	1	: 2	: 3	: 4	: 5	: 6	: 7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

4. For me, lowering high blood pressure is

good	1	: 2	: 3	: 4	: 5	: 6	: 7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

5. For me, difficulty in providing acceptable food for visitors is

good	1	: 2	: 3	: 4	: 5	: 6	: 7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

6. For me, being bored is

good	1	: 2	: 3	: 4	: 5	: 6	: 7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

7. For me, an improved awareness and interest in food is

good	1	: 2	: 3	: 4	: 5	: 6	: 7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

8. For me, reduced fluid retention in the body is

good	1	: 2	: 3	: 4	: 5	: 6	: 7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

9. For me, having difficulty in dining out is

good	1	: 2	: 3	: 4	: 5	: 6	: 7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

10. For me, an increased appreciation of the flavour of food is

good	1	2	3	4	5	6	7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

11. For me, taking more time in food preparation is

good	1	2	3	4	5	6	7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

12. For me, eating healthier food is

good	1	2	3	4	5	6	7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

13. For me, reducing medication for high blood pressure is

good	1	2	3	4	5	6	7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

14. For me, an increased sense of well being is

good	1	2	3	4	5	6	7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

15. For me, reducing the risk of heart attack, stroke or other medical problems is

good	1	2	3	4	5	6	7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

16. For me, having friends put pressure on me to stop eating low sodium food is

good	1	2	3	4	5	6	7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

17. For me, preventing high blood pressure is

good	1	2	3	4	5	6	7	bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

* * *

The next section relates to how other people help or hinder your low sodium diet. Please answer this section 'to the best of your knowledge'.

1. My doctor thinks I should eat low sodium food.

likely 1 : 2 : 3 : 4 : 5 : 6 : 7 unlikely
extremely quite slightly neither slightly quite extremely

2. Food manufacturers think I should eat low sodium food

likely 1 : 2 : 3 : 4 : 5 : 6 : 7 unlikely
extremely quite slightly neither slightly quite extremely

3. My friends think I should eat low sodium food.

likely 1 : 2 : 3 : 4 : 5 : 6 : 7 unlikely
extremely quite slightly neither slightly quite extremely

4. My spouse thinks I should eat low sodium food.

likely 1 : 2 : 3 : 4 : 5 : 6 : 7 unlikely
extremely quite slightly neither slightly quite extremely

5. People interested in health think I should eat low sodium food.

likely 1 : 2 : 3 : 4 : 5 : 6 : 7 unlikely
extremely quite slightly neither slightly quite extremely

6. People who usually disagree with me think I should eat low sodium food.

likely 1 : 2 : 3 : 4 : 5 : 6 : 7 unlikely
extremely quite slightly neither slightly quite extremely

7. My family thinks I should eat low sodium food.

likely 1 : 2 : 3 : 4 : 5 : 6 : 7 unlikely
extremely quite slightly neither slightly quite extremely

8. Organizations interested in health think I should eat low sodium food.

likely 1 : 2 : 3 : 4 : 5 : 6 : 7 unlikely
extremely quite slightly neither slightly quite extremely

9. Most people or groups who are important to me think I should eat low sodium food.

likely 1 : 2 : 3 : 4 : 5 : 6 : 7 unlikely
extremely quite slightly neither slightly quite extremely

10. The value I place on my doctor's opinion is generally

high 1 : 2 : 3 : 4 : 5 : 6 : 7 low
extremely quite slightly neither slightly quite extremely

11. The value I place on food manufacturers' opinion is generally

high 1 : 2 : 3 : 4 : 5 : 6 : 7 low
extremely quite slightly neither slightly quite extremely

12. The value I place on my friends' opinion is generally

high 1 : 2 : 3 : 4 : 5 : 6 : 7 low
extremely quite slightly neither slightly quite extremely

13. The value I place on my spouse's opinion is generally

high 1 : 2 : 3 : 4 : 5 : 6 : 7 low
extremely quite slightly neither slightly quite extremely

14. The value I place on the opinion of people interested in health is generally

high 1 : 2 : 3 : 4 : 5 : 6 : 7 low
extremely quite slightly neither slightly quite extremely

15. The value I place on the opinion of people who usually disagree with me is generally

high 1 : 2 : 3 : 4 : 5 : 6 : 7 low
extremely quite slightly neither slightly quite extremely

16. The value I place on the opinion of my family members is generally

high 1 : 2 : 3 : 4 : 5 : 6 : 7 low
extremely quite slightly neither slightly quite extremely

17. The value I place on the opinion of organisations interested in health is generally

high 1 : 2 : 3 : 4 : 5 : 6 : 7 low
extremely quite slightly neither slightly quite extremely

18. The value I place on the opinion of most people or groups who are important to me is generally

high	1	: 2	: 3	: 4	: 5	: 6	: 7	low
	extremely	quite	slightly	neither	slightly	quite	extremely	

* * *

The next four statements are each followed by eleven pairs of adjectives. Using the categories of definitely, generally, somewhat and neither, which are set out at the bottom of each list of adjectives, you are to choose which category best describes your attitude to carrying out the behaviour.

DO THIS FOR <u>EACH</u> OF ELEVEN PAIRS OF ADJECTIVES - only one per line.

1. For me, over the next six months, EATING <u>LOW SODIUM</u> FOOD would be

FOOLISH	1	: 2	: 3	: 4	: 5	: 6	: 7	SENSIBLE
UNAPPETISING	1	: 2	: 3	: 4	: 5	: 6	: 7	APPETISING
EASY	7	: 6	: 5	: 4	: 3	: 2	: 1	HARD
UNHEALTHY	1	: 2	: 3	: 4	: 5	: 6	: 7	HEALTHY
PLEASANT	7	: 6	: 5	: 4	: 3	: 2	: 1	UNPLEASANT
UNBENEFICIAL	1	: 2	: 3	: 4	: 5	: 6	: 7	BENEFICIAL
CONVENIENT	7	: 6	: 5	: 4	: 3	: 2	: 1	INCONVENIENT
BAD	1	: 2	: 3	: 4	: 5	: 6	: 7	GOOD
UNDESIRABLE	1	: 2	: 3	: 4	: 5	: 6	: 7	DESIRABLE
POSSIBLE	7	: 6	: 5	: 4	: 3	: 2	: 1	IMPOSSIBLE
UNSOCIABLE	1	: 2	: 3	: 4	: 5	: 6	: 7	SOCIABLE
	DEFINITELY	: GENERALLY	: SOMEWHAT	: NEITHER	: SOMEWHAT	: GENERALLY	: DEFINITELY	

2. For me, over the next six months, AVOIDING eating food with sodium added would be

FOOLISH	1	2	3	4	5	6	7	SENSIBLE
UNAPPETISING	1	2	3	4	5	6	7	APPETISING
EASY	7	6	5	4	3	2	1	HARD
UNHEALTHY	1	2	3	4	5	6	7	HEALTHY
PLEASANT	7	6	5	4	3	2	1	UNPLEASANT
UNBENEFICIAL	1	2	3	4	5	6	7	BENEFICIAL
CONVENIENT	7	6	5	4	3	2	1	INCONVENIENT
BAD	1	2	3	4	5	6	7	GOOD
UNDESIRABLE	1	2	3	4	5	6	7	DESIRABLE
POSSIBLE	7	6	5	4	3	2	1	IMPOSSIBLE
UNSOCIABLE	1	2	3	4	5	6	7	SOCIABLE
	DEFINITELY	GENERALLY	SOMEWHAT	NEITHER	SOMEWHAT	GENERALLY	DEFINITELY	

3. For me, over the next six months, AVOIDING eating food with sodium added in cooking or at the table would be

FOOLISH	1	2	3	4	5	6	7	SENSIBLE
UNAPPETISING	1	2	3	4	5	6	7	APPETISING
EASY	7	6	5	4	3	2	1	HARD
UNHEALTHY	1	2	3	4	5	6	7	HEALTHY
PLEASANT	7	6	5	4	3	2	1	UNPLEASANT
UNBENEFICIAL	1	2	3	4	5	6	7	BENEFICIAL
CONVENIENT	7	6	5	4	3	2	1	INCONVENIENT
BAD	1	2	3	4	5	6	7	GOOD
UNDESIRABLE	1	2	3	4	5	6	7	DESIRABLE
POSSIBLE	7	6	5	4	3	2	1	IMPOSSIBLE
UNSOCIABLE	1	2	3	4	5	6	7	SOCIABLE
	DEFINITELY	GENERALLY	SOMEWHAT	NEITHER	SOMEWHAT	GENERALLY	DEFINITELY	

4. For me, over the next six months, AVOIDING eating food with sodium added in the manufacturing process would be

FOOLISH	1	2	3	4	5	6	7	SENSIBLE
UNAPPETISING	1	2	3	4	5	6	7	APPETISING
EASY	7	6	5	4	3	2	1	HARD
UNHEALTHY	1	2	3	4	5	6	7	HEALTHY
PLEASANT	7	6	5	4	3	2	1	UNPLEASANT
UNBENEFICIAL	1	2	3	4	5	6	7	BENEFICIAL
CONVENIENT	7	6	5	4	3	2	1	INCONVENIENT
BAD	1	2	3	4	5	6	7	GOOD
UNDESIRABLE	1	2	3	4	5	6	7	DESIRABLE
POSSIBLE	7	6	5	4	3	2	1	IMPOSSIBLE
UNSOCIABLE	1	2	3	4	5	6	7	SOCIABLE
	DEFINITELY	GENERALLY	SOMEWHAT	NEITHER	SOMEWHAT	GENERALLY	DEFINITELY	

* * *

This next section asks you to say as realistically as you can how often you will carry out each of four related behaviours.

1. Over the next six months I will EAT LOW SODIUM FOOD

1	2	3	4	5	6	7
at all times	except once or twice	except about once a month	except two or three times a month	except about once a week	except three or four times a week	except about once a day

2. Over the next six months I will AVOID eating food with sodium added

1	2	3	4	5	6	7
at all times	except once or twice	except about once a month	except two or three times a month	except about once a week	except three or four times a week	except about once a day

3. Over the next six months I will AVOID eating food with sodium added in cooking or at the table

1	2	3	4	5	6	7
at all times	except once or twice	except about once a month	except two or three times a month	except about once a week	except three or four times a week	except about once a day

4. Over the next six months I will AVOID eating food with sodium added in the manufacturing process

1	2	3	4	5	6	7
at all times	except once or twice	except about once a month	except two or three times a month	except about once a week	except three or four times a week	except about once a day

Appendix I

TWO POSSIBLE MODELS OF BEHAVIOUR MAINTENANCE, INCLUDING TIME FROM CHANGE AS A WEIGHTING OF INDEPENDENT VARIABLES.

This appendix contains an extrapolation of the empirical work contained in this thesis, and is proposed as a possible basis for future research. An overview of the present research is provided. This overview leads to the identification of two empirically driven models which include the time from change as a weighting of variables implicated in the maintenance of a health related behaviour.

Summary of Research Findings

As an overall summary, it appears that the strength of the initial behavioural intention and the degree of initial specific social sabotage are important in both short and long term maintenance. It may also be that certain aspects of general support experienced during early stages have a deleterious effect on overall maintenance. However, as the point of measurement moves further away from the early maintenance stage, the significance of the current level of these variables reduces and is replaced by either the cognitive evaluation or the affective response to carrying out the behaviour. Whether cognitive or affective attitude are more significant may depend to an extent on the initial motivation for change.

It is proposed that this initial motivation for change accounts for the difference between experimental subjects and clinical subjects both in the determinants of behavioural intention and of actual behaviour.

Firstly, the cognitive attitude measure, the belief by evaluation of the outcome of performing the behaviour, appears more significant in the experimental group than in the clinical group in determining both behavioural intention and actual behaviour.

Secondly, behavioural intention is of considerable importance as an antecedent of behaviour within the experimental group, while it is of less importance in the cross sectional analysis of long term maintenance within the clinical group. Within the latter group, it is the affective response to carrying out the behaviour which is the most significant predictor of actual performance. The inclusion of initial motivation for change as a weighting of the attitudinal compliance allows for the development of a more general model which accommodates these suggested differences.

Of major concern in this final section is the evidence for a difference in significant antecedents of behaviour when measured at short term versus long term maintenance. In both studies, for example, attitudinal components other than behavioural intention were directly significant in the production of long term maintenance, whereas in early maintenance these factors were mediated through behavioural intention.

A further change from short to long term maintenance appears in certain aspects of general social support which undermine the early maintenance of a health-related behaviour. This early general social support is not directly related to long term maintenance, nor is the degree of social support provided at the same time as the measurement of long term maintenance.

Social support aimed at the performance of the health-related behaviour effects the behaviour only indirectly, through its effect on firming the behavioural intention. As with general support, only the degree of specific support at the early maintenance stage shows this significant effect. The degree of specific support evidenced during long term maintenance affected neither intention nor behaviour. However, unlike general support, the further into the maintenance (i.e. long term) the greater the importance of early specific support was (relative to attitude and subjective norm) in determining behavioural intention.

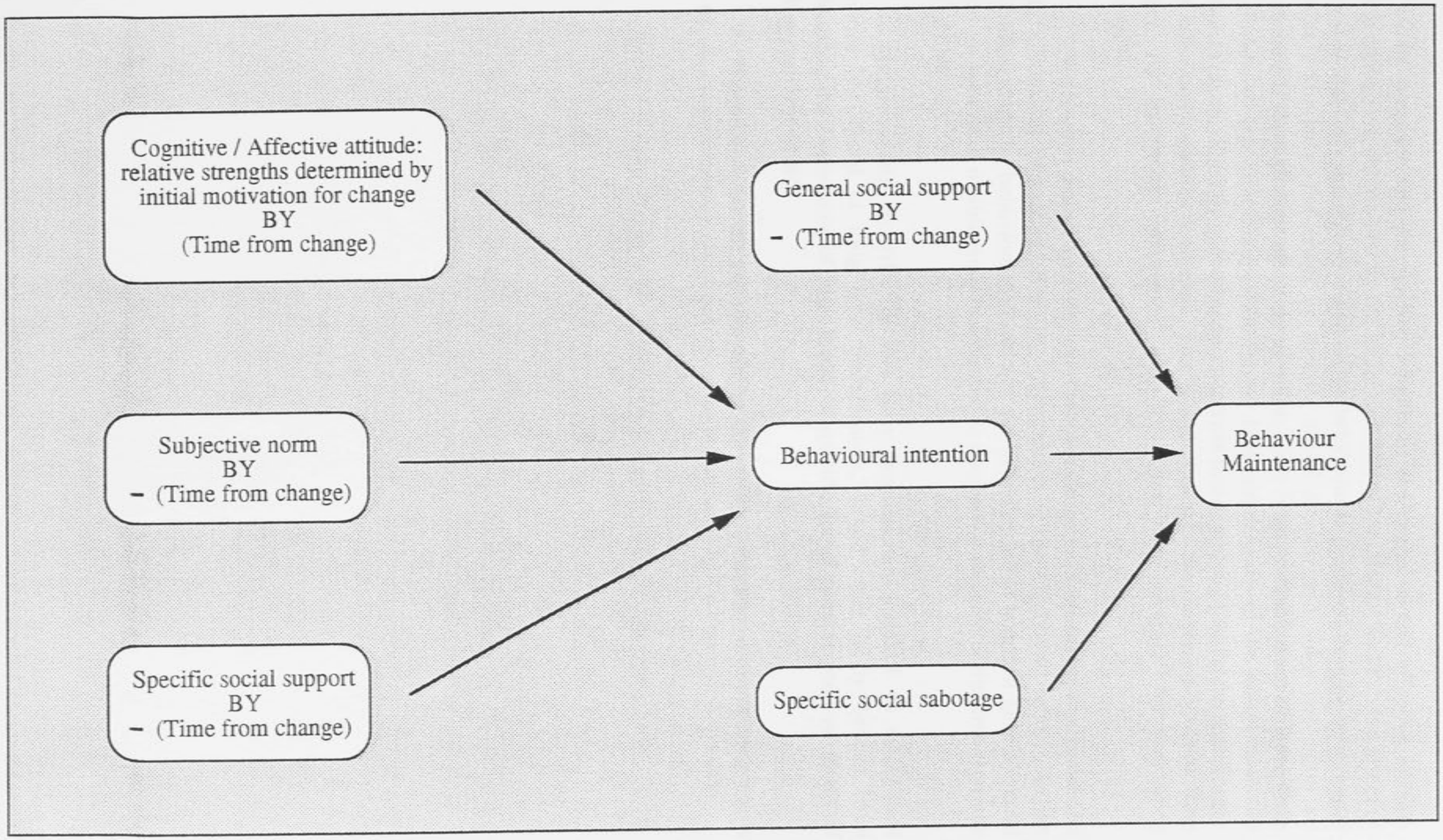
On the other hand, the degree of specific social sabotage experienced during *early* maintenance does not affect intention at the early maintenance stage, but *does* during the late maintenance stage. However, intention during late maintenance is of reduced significance in producing actual behaviour. Finally, the degree of early specific social sabotage experienced is important in determining both the early and the long term maintenance of a health-related behaviour.

Two Models of Behaviour Maintenance

From the results summarised above it would appear necessary to incorporate the length of time from the point of behaviour change in any explanatory model of health-related behaviour maintenance. Rather than attempting to find a single explanation for this complex phenomenon, it may be of more use to separate out two models. The first model defines the relationship between variables observed in the early stages of maintenance as they affect both short and long term maintenance. This model allows for changes in the relative importance of the antecedents of behaviour as the measurement of this behaviour moves further away in time from the measurement of the antecedents. That is the various weightings are determined by the time from making the behaviour change to the point of measuring the *dependent variable*. As discussed previously, most intervention cover only the change and early maintenance stage. This model is useful in determining the significance of different aspects of this stage as they effect both early and long term maintenance.

The second model describes the interaction of the variables irrespective of what point they are measured in the maintenance of the behaviour. In this model the various weightings are determined by the time from making the behaviour change to the point of measurement for that variable *irrespective of whether it is an independent or dependent variable*. Model I is presented overleaf.

Figure 8-4: Model I - Significant antecedents of behaviour maintenance derived from early maintenance stage



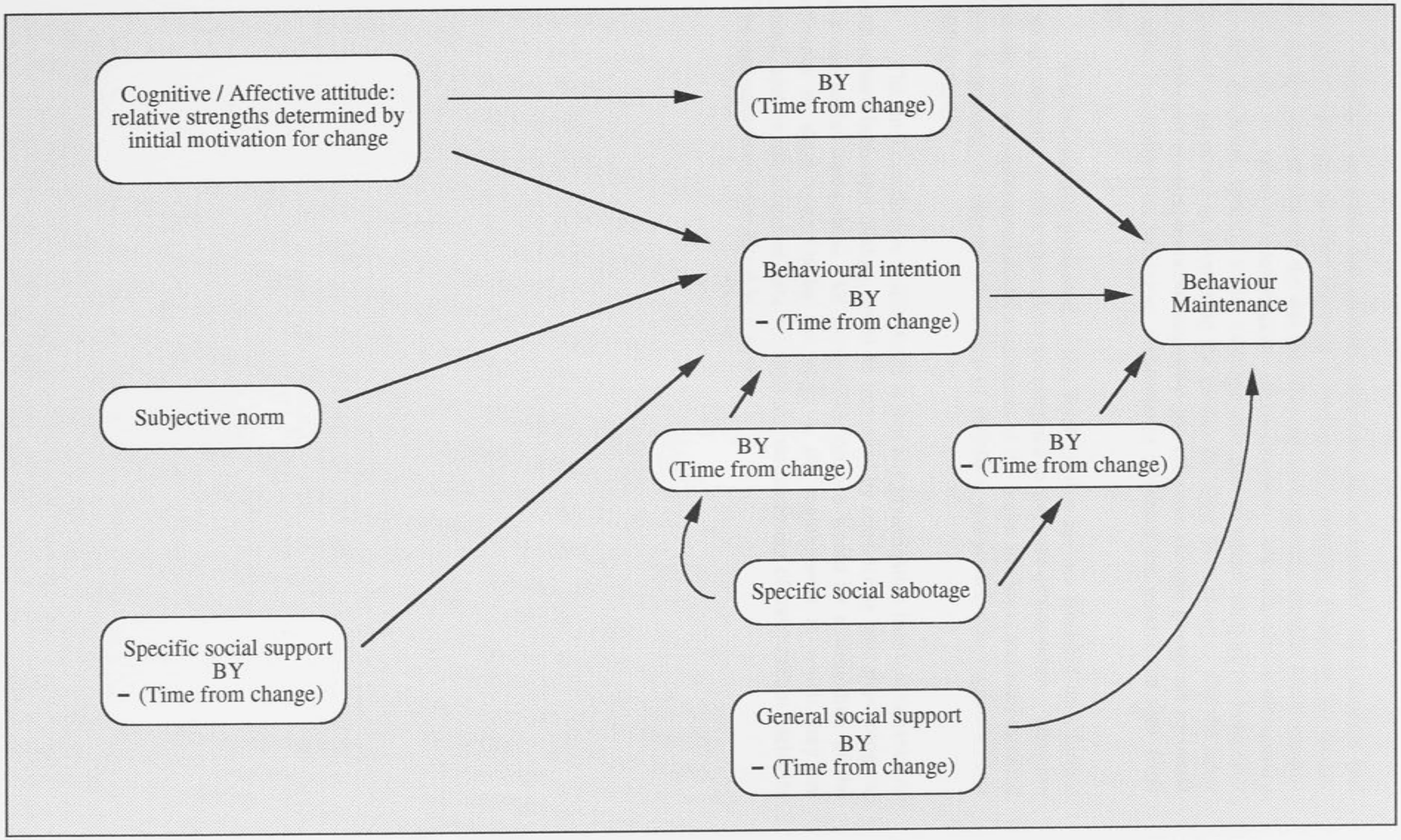
This model proposes that the relative weights of the cognitive and affective attitude towards change are determined by the initial motivation for change, and that the effect of the level at this early maintenance attitude on behaviour is mediated through behavioural intention. Similarly, the effect of specific social support and subjective norm on maintenance is through their effect on intention. The relative significance of these three determinants of intention changes the further into maintenance of the measurement of intention is taken. Specific social support becomes more important while the significance of the other two variables decreases. This is represented in the diagram by '(Time from change)' for increasing importance, and '(- Time from change)' for decreasing importance.

Within this model, specific social sabotage at early maintenance is proposed as having a constant (negative) effect on maintenance of the behaviour, relative to the contribution made by behavioural intention. The effect of initial levels of general social support on behaviour maintenance is proposed as decreasing the greater the time from the point of change.

Interventions occurring at this early maintenance stage of an established behaviour but aimed at long term maintenance, would most likely benefit from emphasising the importance of high levels of specific social support and low levels of specific social sabotage.

The second model, that describing the changes in relative importance across time of contemporaneously measured variables is presented in the Figure 8-5 overleaf.

Figure 8-5 Model II - Significant contemporaneous antecedents of behaviour maintenance.



Model II proposes that attitude, subjective norm, specific social support and specific social sabotage all affect the level of behavioural intention. However, the further away from the point of change, the less the effect of contemporary specific social support and the greater the effect of contemporary social sabotage. The effect of contemporary behavioural intention, specific social sabotage and general social support on behaviour maintenance is proposed as decreasing the greater the time from change. On the other hand, the effect of contemporaneous cognitive and affective attitude (weighted by initial motivation for change) on behaviour maintenance increases the greater the time from change.

The two models presented in this final Section are not intended as a further theoretical challenge to the propositions investigated in the bulk of this thesis. They are empirically driven representations of a synthesis of the major findings, and are presented firstly to help clarify a complex interaction of variables, and secondly to suggest a basis for further work.

The final conclusion of this thesis is that any investigation into maintenance of a health-related behaviour change would be improved by considering both psychological factors and social interactions. Of primary importance would be a weighting of the significance of these variables by the stage in the maintenance at which they are measured, and by the length of time between the measurement of independent variables and the measurement of the actual behaviour.